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CANCER OF THE LARYNX AND OF THE PHARYNX*

RESULTS OF RADIATION THERAPY AT CHARITY HOSPITAL

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Cancer of the larynx should be of special interest to the local medical profession since the incidence of the disease is unduly high in New Orleans. A few years ago McDowell and others conducted a survey on the distribution of cancer in several American cities and made the observation that the prevalence of laryngeal carcinoma was greatest here. No explanation could be offered, but partly as a consequence of this, perhaps, Louisiana bears the doubtful distinction of being the state with the third highest mortality in the country. Cancer of the pharynx has been notable chiefly for its highly malignant course and for its failure to yield to nearly all forms of therapeutic attack. It is not surprising, therefore, that in reviewing the records of patients treated some years back we come upon results that are short of a satisfactory level. Nevertheless, the nature of these lesions is such that some encouragement may be derived from the limited success achieved and in the present report we propose to analyse the work of the first four years that the cases have been under our care.

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MATERIAL

During the period 1939-1942 inclusive, 104 new cases of cancer of the larynx and of the pharynx were referred to us for treatment, but attention will be confined to 88 cases with histologic proof treated by radiation alone or not treated at all. Since there were five survivors among the 16 excluded cases, their elimination from the analysis does not favor the end results, as will be apparent later.

The deletions are dictated, rather, by a desire to determine the effectiveness of radiation, unaided by any auxiliary measure, in authentic cases of laryngopharyngeal cancer. Thus, we find that twelve cases lack histologic confirmation, though biopsies were performed in all but two. There is little doubt that these patients had malignant tumors, since nearly all died within a few months with obvious clinical signs of advanced disease. But the biopsy material was unsatisfactory for establishing the diagnosis and their inclusion in the series would vitiate the results obtained in the proved cases; consequently they must be ignored in the analysis. It is unfortunate that difficulty has been experienced in securing adequate tissue for pathologic study, for in several other instances as many as five or six biopsies were required before positive information was obtained. Needless to say, this entails considerable delay in the institution of treatment and renders the prognosis graver for the patient. Four additional cases were referred to us after

operation without definite evidence of residual disease; it would be difficult to determine the extent to which radiation therapy contributed to their recovery, hence they are omitted. On the other hand seven cases with recurrence following operation or irradiation have not been deleted.

All but three of the 88 accepted cases have been traced. The cases lost to follow-up are counted as dead from cancer, and the patients who refused treatment, or who were too ill to receive anything but custodial care, are considered radiation failures. Thus we are able to assess the minimum accomplishment of radiation therapy in consecutive cases with active cancer demonstrated histologically.

CLASSIFICATION

The topographic distribution of the 88 cases included in the series is shown in table 1. The site of the lesion is indicated, although in several instances the extent of involvement made it difficult to determine the structure where the disease developed initially; however, it is nearly always possible to settle this matter during the course of treatment, since tumors under radiation therapy disappear last from their point of origin. It is rather surprising that no lesions of the post cricoid region were observed.

TABLE 1
TOPOGRAPHIC DISTRIBUTION

	No. of Cases	Per Cent
Upper Pharynx		
Rhinopharynx	6	7
Soft palate	12	14
Tonsil	14	16
Lower Pharynx		
Vallecula and base of tongue	13	15
Aryepiglottic fold	7	8
Pyriform sinus	6	7
Lateral and posterior walls of pharynx	10	11
Endolarynx		
Ventricular band	7	8
Ventricle	1	1
Vocal cord	11	12
Subglottic region	1	1
Total	88	100

The cases have been divided into three groups to facilitate the discussion by taking advantage of similarities in clinical course and response to treatment. This is simply a matter of convenience since the fact remains that each localization presents striking individual features. Some of these were pointed out by Schwartz, Butlin and others more than sixty years ago and as early as 1879 Krishaber emphasized the remarkable difference between "extrinsic" and "intrinsic" carcinomas of the larynx; unfortunately his simple classification has lost much of its utility for purposes of comparison, due to the varied manner in which it has been interpreted. Recently Leroux-Robert, and Lederman have quite correctly proposed more elaborate classifications, but the number of cases submitted to the present analysis hardly justifies the employment of either.

CLINICAL MANIFESTATIONS AND DIAGNOSTIC SURVEY

The symptomatology of the lesions under consideration is varied and can usually be correlated with the site of origin, since for each there seems to correspond a more or less characteristic pattern. Unfortunately such a pattern becomes quite clear only when the disease is well advanced. Inaugural signs are absent except in carcinoma of the vocal cord and a long silent period is the rule. Suggestive symptoms are hoarseness, sore throat, a feeling of stuffiness in the ear, and nose bleed. On the other hand Jackson and others have pointed out that hoarseness may be absent or intermittent in carcinoma of the larynx if the tumor is proliferating in structures other than the cord. The more classical symptoms of dysphagia, dysphonia, dyspnea and cough become apparent when the disease is well established, while cervical abscess and cervical nodes, not infrequently the presenting signs on admission at Charity Hospital, are clear evidence of extensive dissemination. Nearly all the patients we see manifest a severe constitutional effect, indicated by loss of weight, anemia, and in many instances, by fever, due either to tumor sepsis or to pulmonary complications.

It is imperative, therefore, that a patient under consideration for radiologic treat-

ment should receive the benefit of a diagnostic survey as complete as that of a candidate for radical surgery, in order that the information obtained may provide a sound basis for a rational plan of treatment. We must avail ourselves of every diagnostic aid obtainable by history and physical examination, direct and indirect laryngoscopy or pharyngoscopy, radiographic studies, biopsy and any supplementary laboratory tests that will enable us to appraise the true state of affairs, both from the standpoint of the local disease and of the general condition of the patient. The actual extent of the tumor and its site of origin must be defined with all possible precision, as well as its gross architecture, the extent of infection and necrosis, the presence of invasion and destruction of cartilage or bone, and the degree to which the mobility of the normal parts has been impaired by the advance of the neoplasm. We believe that the value of radiography has been insufficiently realized and probably laminography, as developed by Leborgne, has been too greatly neglected. A three dimensional concept of the extent of the tumor can be obtained by lateral projection of the neck in combination with a laminograph. Such visualization of the limits of the new growth permits a comprehensive attack on the disease with economy and efficiency.

METASTASES

One of the essential points to be determined in the study of the patient is the presence and the extent of cervical metastases, since they affect the chance for recovery in a decisive manner. Metastatic involvement of the nodes of the neck occurred in 43 per cent of our cases on admission, and more than a quarter of the remainder developed it subsequently so that altogether 57 per cent of all our cases had metastases at some time in the period of observation. Thus metastases occurred initially in 17 of the 32 upper pharyngeal tumors, in 15 of the 36 lower pharyngeal tumors and in six of the 20 carcinomas of the endolarynx. This is somewhat lower than in the series reported by Duffy and by Taylor and Nathanson. Simple adenectomies were done in two cases before being referred to us for treatment, but no radical dissections were performed in any of the others, reliance being placed on x-ray and radium therapy for their control. This is in accord with surgical opinion. Whereas radical neck dissection is the treatment of choice in nodes secondary to intra-oral cancer satisfying the criteria proposed by Duffy, the metastases from the lesions included in the present analysis as a rule are not suitable for surgical extirpation in the opinion of Hayes Martin, and essentially the same view is held by Taylor and Nathanson. Obviously the proportion of cases eventually salvaged by irradiation in this highly malignant group is smaller than in cases suitable for surgical treatment, but there is little justification for the commonly expressed scepticism regarding the effectiveness of radiation therapy. Martin, for instance, has reported a group of 46 cases with proved metastases well five years after radiation therapy and 44 others well from two to four years. Five of our cases, that is, 13 per cent remain well three years after treatment; in three of these histologic proof of metastases was obtained. Of 19 cases with metastases treated more than five years ago three remain well.

TREATMENT

Surgery has an excellent record of success in the treatment of the early and moderately advanced stages of endolaryngeal carcinoma, (Jackson, LeJeune, Peacock and Colledge, and others) but it has met difficulties and reverses in the management of lesions arising in the other sites considered. This provided a stimulus for the original attempts at treatment by radiation. No significant improvement occurred, however, until Coutard employed the principle of protracted fractionation based on the experimental work of Regaud. This revised all previous conceptions regarding the utility of radiation in this field and must be recognized as a landmark in the therapy of these tumors—the inoperable case need no longer be considered incurable. To what extent radiation can replace operation in the favorable case cannot be determined from our

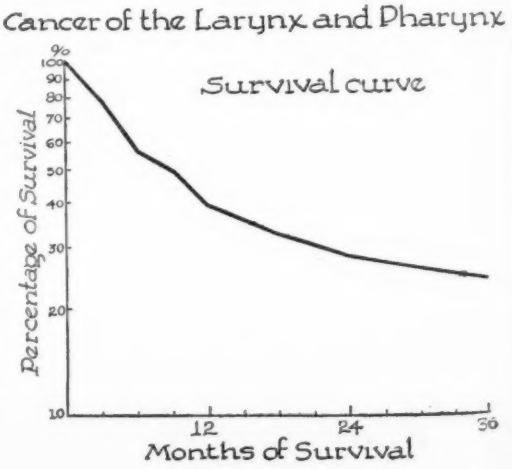
material, for few of the cases seen by us had lesions technically within the scope of surgical excision; the few exceptions were represented by patients whose advanced age or impaired general health rendered them unsuitable for surgical treatment.

The Coutard method must be considered a radical therapeutic procedure and as such cannot be undertaken without careful study and preparation of the patient. It cannot be carried out in a routine fashion but on the contrary requires a hign degree of individualization. The tolerance of the normal structures must be reached. Sharp reactions must be produced and the discomfort may be so pronounced that the general condition of the patient may become affected. The principal difficulty lies in judging the correct range of dosage that will fail to impair the general health of the patient without sacrificing control of the disease. The two main factors bearing on this point are the volume of tissue subjected to high dosage and the rate of administration of treatment. It is for this reason that definition of the limits of the tumor is so essential, in order that the minimum possible volume will manifest reactions of a marked degree. With careful study of the physical problem in the individual case and continuous clinical observation, the treatment can be executed with little risk of serious injury and without making the procedure too taxing for the patient. C. L. Martin, Stewart-Harrison and others have published valuable studies of the details of treatment. The optimum distribution of dosage in time remains undefined but for the last three years we have aimed at delivering a tumor dose of 4400 r ± 10 per cent in a period of 30 days when the area of the treatment ports did not exceed 50 sq. cm. A somewhat lower dosage must be employed if the area is larger, and Paterson has emphasized the importance of wide fields in dealing with the more anaplastic carcinomas and with lymphosarcomas. Berven, Cade, and Lamerton have employed teleradium therapy in place of external x-ray therapy with equal success. Stone and Larkin have made a preliminary report on the employment of neutron beam therapy in tumors of this type, and the results appear promising.

In some localizations of the disease intracavitary radium therapy may be used to advantage as a supplement to x-ray therapy, notably in carcinomas of the rhinopharynx. Supplementary treatment may be administered also in the form of interstitial radium implants, as in certain carcinomas of the vallecula, the base of the tongue, the tonsil, and metastatic cervical lymph nodes. The implant is done in a single or a double plane and the tissue dosage is between 3000 and 6000 r (gamma). Interstitial radium therapy is seldom employed in the treatment of endolaryngeal carcinoma but one of the cases in the present series received radiation in this manner by a modification of the method developed by Douglas Quick for carcinoma of the cord too extensive for laryngectomy. A laryngostomy was performed, followed by insertion of radium needles directly into the exposed tumor for a period of five days, and control of the disease has been secured for a period of nearly seven years.

RESULTS

As previously stated, all the cases included in this series were inoperable, either for technical or for clinical reasons. The trend of survival is shown in figure below; the decline in survivors is rapid at first, but



beyond the second year the slope begins to approach the horizontal, and at the end of the third year 24 per cent of the patients remain alive.

In table 2 an effort is made to elicit the prognostic influence of certain features of the disease. Various histologic types show differences in survival rate but the number of cases is too small to make the discrepancies significant. A somewhat arbitrary distinction is made between the anaplastic and the epidermoid carcinomas; we include in the former group the undifferentiated tumors and some which were classified as

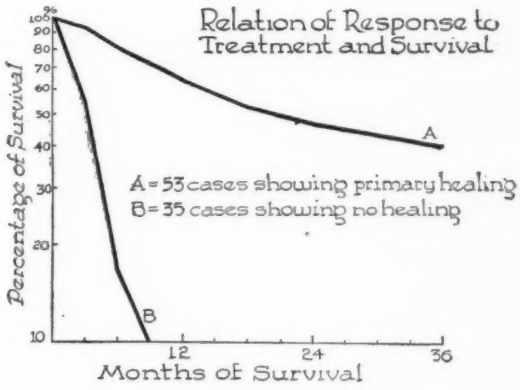
TABLE 2
PROGNOSTIC FACTORS

	No. of Cases	Survival Rate Per Cent
Histologic Type		
Epidermoid carcinoma	65	18
Anaplastic carcinoma	16	31
Adenocarcinoma	3	100
Lymphosarcoma	3	33
Lymphangioendothelioma	1	0
Race		
White	64	23
Negro	24	25
Sex		
Male	75	21
Female	13	38
Metastatic Involvement		
Metastases on admission	38	13
No metastases on admission	50	32
No metastases any time	39	36
Response to Treatment		
Completed treatment	77	27
With primary healing	53	40

transitional carcinoma and as lymphoepithelioma. It does not seem worth while for the present to segregate the more keratinizing tumors from those of the so-called mucosal type, nor to seek for correlation between the histologic grade of the tumor and the outcome of treatment. Such an attempt is best postponed until a larger group of cases becomes available. It is interesting, however, that the more immature carcinomas show a better result, and that the adenocarcinomas responded well to treatment. Chance fluctuations cannot be excluded, but at least it is possible to say that adenocarcinomas are not necessarily radioresistant, as has been frequently maintained.

No significant racial differences can be demonstrated, but the better results observed in women seem to be a consistent finding in series subjected to analysis. The difficulty in controlling metastatic disease in the neck is clearly reflected in the inferior survival rates attained, whether such spread was evident on admission or subsequent to control of the primary lesion.

The immediate response to treatment, and its completeness, obviously have prognostic significance. Only 77 of our cases completed treatment; the others either refused or were too ill to justify the administration of full dosage. None of these patients survived for a year, and the same was true of the ones who failed to show primary healing. The relation between response to treatment and survival is depicted in figure below. It is evident that in



unselected material only about 60 per cent of the patients receive tangible benefits from our present methods of irradiation, in the form of freedom from symptoms and longer survival. Coutard has explored the possibilities of many variations in technic, in an effort to extend the range of cases that could be successfully handled, but unfortunately no concrete information has thus far been obtained. It would seem

equally important to establish objective criteria for judging the suitability of lesions before treatment is instituted, in the same fashion that we have criteria of operability, but to date no facts have been elicited that would enable us to foretell in a definite manner what would be the response to therapy in an individual case. For the present the factors best suggesting a favorable response are: limited anatomic involvement, preservation of the mobility of the normal parts, and a papillary architecture of the tumor. Yet a good result remains attainable in the absence of all these signs, and in default of any means of recognizing the unsuitable case every patient must be given the benefit of a trial by radiation. Once primary healing is achieved, late failure occurs as a result of local recurrence in 34 per cent of the cases, of metastases in 22 per cent, and of intercurrent disease in 4 per cent, while 40 per cent remain alive and well at the end of three years.

The results with respect to the localization of the lesions appear in table 3 and

TABLE 3
CARCINOMA OF THE LARYNX AND PHARYNX
THREE YEAR END RESULTS
HISTOLOGICALLY VERIFIED CASES
1939-1942

	No. of Cases	Survival Rate Per Cent
Upper pharynx	32	31
Lower pharynx	36	11
Endolarynx	20	35
Total	88	24
Schinz	300	19
Juul	88	28

the rates reported by Juul and by Schinz are quoted for comparison. Lesions of the lower pharynx yield significantly lower results, and in this region lies the greatest need for improvement in our method of treatment.

In table 4 we have listed the results of treatment of endolaryngeal carcinoma reported by several institutions in this country and abroad. The general average for the 248 collected cases is 34 per cent. The rates are remarkably consistent when one considers the wide variation in geographic location, in clinical material, and in technic of treatment. Hence, contrary to general impression, the patient with laryngeal car-

TABLE 4
ENDOLARYNGEAL CARCINOMA
RESULTS AT THREE YEARS

	No. of Cases	Survival Rate Per Cent
Cutler	84	37
Charity	20	35
Lenz	21	33
Coutard	77	32
Schinz	37	27
Juul	9	22
Total	248	34
Surgery		
Colledge and Peacock	39	46

Permanency of Radiologic Healing (Coutard)

	No. of Cases	Survival Rate Per Cent
Three years	77	32
Five years	142	27
Ten years	87	22
Fifteen years	31	19

cinoma subjected to treatment by radiation has more than a forlorn hope of recovery. If the treatment is properly administered a surprisingly good salvage can be attained with regularity. We say surprisingly good because we must not lose sight of the fact that these results are obtained in unselected material, the bulk of which is made up of far advanced lesions. It seems likely that more impressive rates could be achieved if earlier lesions were also included. Moreover, the permanency of the healing secured is shown by Coutard's cases, whose period of observation now extends over more than fifteen years.

The absolute results observed in 47 cases treated more than five years ago are given in table 5. Thus radiation therapy can be seen to bring about recovery in one-fifth

of unselected cases of laryngopharyngeal cancer.

TABLE 5
CARCINOMA OF THE LARYNX AND PHARYNX
FIVE YEAR END RESULTS
HISTOLOGICALLY VERIFIED CASES
1939-1940

	No. of Cases	Survival Rate Per Cent
Upper pharynx	21	28
Lower pharynx	15	7
Endolarynx	11	27
Total	47	21

SUMMARY

An analysis is made of 88 cases of cancer of the larynx and of the pharynx seen consecutively, and proved histologically, at the Charity Hospital of Louisiana during the four-year period, 1939-1942. The method of treatment employed is described, prognostic features of the disease are evaluated, and the results obtained are reported. The three year recovery rate is 24 per cent, while in 47 cases observed for more than five years the recovery rate is 21 per cent.

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DISCUSSION

Dr. Leon J. Menville (New Orleans): I am sure that all of us have benefited by the magnificent dissertation given us by Dr. Garcia. I have followed with interest the splendid work he and his co-workers, Drs. Schlosser and Marino, are doing at the Charity Hospital treating cases of carcinoma of the larynx by irradiation therapy.

There is so much one can say on such an important subject, irradiation treatment of carcinoma of the larynx, and so little time to discuss it. I know that the older members of the profession, in attendance at this meeting can recall just a few years ago that a patient with advanced laryngeal carcinoma was doomed to die. Dr. Garcia and his co-workers have presented us with certain statistics which prove that even the far advanced cases have a fair chance of recovery. Their three years survival rate of cases, most of whom were in a moderate to advanced stage of the disease when treated by irradiation therapy, was 24 per cent. This percentage of survival rate compares most favorably with similar statistics by radiologists of this and other countries. I am sure that Dr. Garcia at some future time could present to us a statistical report on early cases of laryngeal carcinoma with a much greater survival rate. In the series presented by him a great number of these patients when first treated showed not only massive involvement of the oral or laryngeal cavity but metastasis to lymph structures. I believe that there were 12 per cent of such cases in his series and in spite of this handicap in treatment a creditable number survived three years.

Another thing I would like to call to your atten-

tion which sometimes occasions interference with the completion of the treatment, is the reaction which occurs on the skin of the patient. This may alarm the patient and even the referring physician. I know from experience that the referring physician at times has asked that the treatment be discontinued because the patient had been burned. It is impossible to transmit to the cancer tumor a sufficient dose of irradiation without producing skin damage. While it is not the purpose of the treatment to produce a reaction to the skin but as Dr. Garcia explained, the amount of radiation required at the lesion to produce good results will be an amount which does produce skin reaction. However, the skin changes are more or less transitory and seldom produce permanent damage, and even so who would object to some skin changes if they have a chance for a cancer cure.

Again I wish to take the opportunity to compliment Drs. Garcia, Schlosser and Marino for this most edifying and enlightening demonstration of the work they are doing at the Charity Hospital on irradiation therapy of carcinoma of the larynx.

Dr. L. A. Fortier (New Orleans): I enjoyed the paper by the authors so much I must get up and say a few words on this subject. The doctors are to be congratulated on their excellent work and the presentation as made.

It is quite true that some of these patients get well and in my experience I possibly have had eight patients with laryngeal carcinoma to remain well five years or longer. That is not a large number but still is encouraging. It is quite true too that the persons who get well require a good heavy dose of radiation and that skin changes do occur. The work is difficult and trying to the patients and to ourselves but when you do get good results it is most encouraging and gratifying.

Dr. Rudolph Matas (New Orleans): I am so much pleased with the results that radiation is getting now, as compared with what we had fifteen years ago, I want to know in what way our present technic in dealing with these cases compares with the primitive way years ago. Radiation at first was most discouraging, and only radium in laryngeal fissure accomplished results. Dr. Garcia has given us a magnificent picture of progress. I think it is the technic we are interested in. This encourages us to hope that we will go still further and surpass definitely all the effects of surgery. We had gotten to believe from experience with radiation years ago that operation gave us best result. That was my own experience.

Like all the other work the laryngologic department at the hospital has shown wonderful progress in the course of the last few years. This is due of course chiefly to the operators in that department.

I would like for Dr. Garcia to give us information about the technic of interlaryngeal application of x-rays.

Dr. Manuel Garcia (in closing): We feel honored by Dr. Matas' question.

In the preparation of this report we reviewed all records of carcinoma of the larynx at Charity Hospital. The first was recognized in 1875 and from 1894 on several were treated by tracheotomy and by other operations, but the first successful laryngectomy was done in two stages in 1914 by Dr. Matas, assisted by Dr. Maes. The patient spoke only Spanish and his name was Antonio Morales. I know therefore how far Dr. Matas dates back his interest in this subject.

Our understanding of the dosage of radiation that constitutes adequate treatment is the product of the last ten years. We had to rely naturally on a period of trial and error and the original work along these lines done by Coutard in 1921 was not duplicated anywhere else to my knowledge until seven years later. A great many technics have been tried. The essence of modern x-ray therapy is to administer a very large dose, which is associated with the production of reversible marked reactions in the normal structures. This requires a very precise delineation of the limits of the tumor, in an effort to determine the exact extent of the disease, so that by including the minimum possible volume of tissue in the x-ray beams high dosage can be given with relative safety. The difficulty at first was that enormous areas, extending from the zygomatic arch to the clavicle, were irradiated, and under such circumstances any attempt to cause changes in the tumor resulted in alarming effects on the normal structures. Now we know that we can get by with even higher ranges of dosage safely provided we have a small volume of tissue to irradiate, and for that reason lay much emphasis on the preliminary study of the patient. The object of treatment at present is to administer 4400 r in about 30 days with a variation of $\pm$ 10 per cent. Naturally it is necessary to watch the patient very closely throughout the period of treatment. I think the radiologist has to do that himself. He cannot rely on the assistance of the laryngologist since he is not familiar enough with the reactions of normal and neoplastic tissues nor with the modifications that must be introduced when necessary to avoid complications without sacrificing control of the disease. So that the progress in radiation therapy depends not on improvement of equipment or in standardization of technic but on clinical judgment and on a knowledge of the biological reactions produced by radiation.

We feel equally grateful to Dr. Fortier and Dr. Menville for their kind remarks and for their valuable contribution to the discussion.

THE NEED FOR A BETTER APPRECIATION OF THE VALUE OF MULTIPLE PRECORDIAL LEADS*

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The use generally of precordial leads clinically is governed by empiricism rather than by an appreciation and application of the present day knowledge of the processes of depolarization and repolarization. The empirical use of a single or only a few precordial leads results in an inadequate survey of cardiac injury and, often a false security in diagnosis. The latter error is particularly important when it is realized that an electrocardiographic inventory of the myocardium consisting of the standard leads and a grossly inadequate number of precordial leads is usually accepted as a complete survey with religious faith. Obviously, an extensive electric exploration of the precordium is not indicated routinely, but in many patients in whom an electrocardiogram is advised a complete exploration is imperative to insure a proper evaluation of the cardiac problem. Not only can the electrocardiogram, through a proper integration of the limb and precordial leads, render aid in the diagnosis of cardiac disease, but it can outline the extent of lesions. Such a survey often locates them precisely, indicates the course of the pathologic process and thereby aids in the management and prognosis of the clinical state. It is the purpose, through the medium of myocardial infarction, to demonstrate in a few patients selected from many similar instances some of the principles governing the use of multiple precordial leads.

THEORETICAL CONSIDERATIONS

The electrocardiogram enjoys a significant role in the clinical management of myocardial infarction because with infarction there results definite alterations in the orders of depolarization and repolarization which are rather specific and measurable. Without entering into a discussion of the mechanisms concerned, some of the electrical forces somewhat peculiar to infarction which influence the electrocardiographic patterns and the placing of electrodes are mentioned. As pointed out by Bayley[1] and discussed by Burch and Winsor[2] some of the manifest electric forces are shown diagrammatically by figure 1. Figure 1A shows the three zones which follow infarction. The more centrally located zone is zone of dead muscle or *Dead Zone*. Because of death it is physiologically inactive. Immediately surrounding this zone is a *Zone of Injury*, that is, an irregular shell of muscle encasing the dead zone. The muscle in this zone nearest the dead zone is closer to death than that farthest away. Because of the injury, "currents of injury" result. An irregular shell of muscle encloses the zone of injury. This shell is not seriously injured but it is not normal. It suffers from some impairment of blood supply or is ischemic. It is known as the *Zone of Ischemia*. That portion of muscle near the zone of injury is more ischemic than the portion adjacent to normal muscle. Myocardial infarcts are usually subepicardial while subendocardial infarction is relatively rare, incidences based upon peculiarities of circulation.

When the exploring electrode is placed directly over an area of infarction the disturbances in the orders of depolarization are easily recorded. During depolarization the electric force of depolarization is stronger in the opposite wall than in the infarcted wall since there is more mass of muscle depolarization in the normal opposite wall than in the injured one. This results in a field of relative negativity in the region of the precordial or exploring electrode. Therefore the depolarization wave (QRS complex) in the completed electrocardiogram shows no R wave, the initial wave being a negative wave (QS wave). This QRS change is indicative of infarction *per se*, that is, dead muscle or the *Dead Zone*. The absence of an R wave may be

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interpreted as evidence of a "physiologic hole" in the heart.

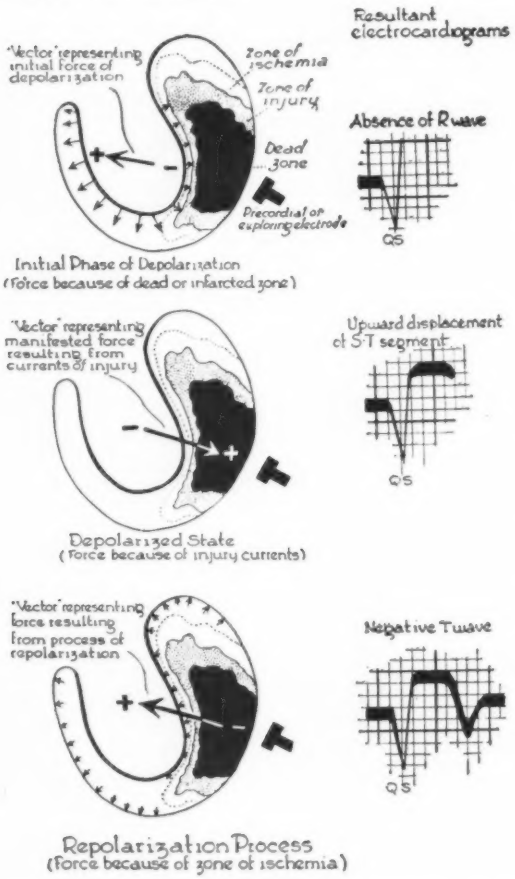

Figure 1. A diagrammatic representation of the electric forces which would manifest themselves strongly on an electrode placed directly over an area of subepicardial infarction.

A shows how the dead zone which cannot be depolarized upsets the normal balance of depolarization forces, thereby reducing the force produced in the region of the infarct. The resultant "vector" force is directed away from the exploring electrode thus creating a region of strong relative negativity around the electrode. This results in an initial negative or QS wave in the QRS complex (the depolarization process) with an absence of an R wave in the completed electrocardiogram.

B shows how the zone of injury results in a manifested force when the myocardium is in a depolarized state. This manifested force involves a consideration of the compensating current used in controlling the string shadow. It is directed toward the exploring electrode and creates a field of relative positivity around the electrode. This results in an upward displacement of the S-T segment.

C shows how the zone of ischemia delays the process of repolarization and thereby repolarization begins in the subendocardial region in the infarcted portion of the heart. With the order of repolarization progressing from endocardium to epicardium in the wall with the infarct and from the epicardium to the endocardium in the opposite non-infarcted wall the resultant electric force of repolarization is directed away from the exploring electrode. This creates a field of relative negativity in the region of the electrode and a negative or inverted repolarization wave or T wave is inscribed in the completed electrocardiogram.

If the exploring electrode were placed on the wall opposite the area of infarction the resultant forces discussed above would influence it oppositely and the components of the electrocardiogram would show opposite changes.

Part B of figure 1 shows the electric force which manifests itself when the myocardium is in the depolarized state. Burch and Winsor[2] have explained in detail the mechanism for this force. The S-T segment is inscribed during the interval between periods of depolarization and repolarization. Since the manifested force is directed toward the exploring electrode creating a field of relative positivity around the electrode there results an upward displacement of the S-T segment. This force exists because of the "currents of injury" present in the Zone of Injury. Therefore an S-T displacement indicates injury.

Part C of figure 1 shows the electric force responsible for the negative T wave in infarction. The process of repolarization within the normal wall opposite that with the infarct begins at the epicardial region. In the region of the infarct the surrounding shell or zone of ischemia impairs the onset of repolarization. As a result repolarization begins in the subendocardial regions and migrates out toward the epicardium. The resultant electric forces of the repolarization processes are directed away from the exploring or precordial electrodes thus producing a field of relative negativity around the electrode. This is associated therefore with the inscription of a negative

wave of repolarization (T wave) in the completed electrocardiogram.

It is quite obvious from the discussion above and figure 1 that in order for an exploring electrode to pick up these forces it must be placed directly over the infarct for then the electric forces are directed normally to the electrode. If the electrode is placed at right angles to these forces or 90° away from the epicardial surface of the infarct, little or no influences on the electrode result. If the electrode is placed only over the zone of ischemia, T wave changes alone are noted, and so on. With these concepts in mind it is simple to realize how the proper use of the exploring electrode to explore the surface of the heart can result in not only discovering an infarct but also in delineating it rather precisely. The electrocardiograms discussed below illustrate this.

Therefore, (1) *QRS changes are the only electrocardiographic signs of death of cardiac muscle or infarction;* (2) *S-T segment shifts indicate the existence of myocardial ischemia.* A "vector" drawn from the centroid of the infarct to the centroid of the heart may be employed to represent the initial depolarization (QRS) force of *dead* (infarcted) muscle. A "vector" drawn from the centroid of the heart to the centroid of the infarct may be employed to represent the manifest electric force developed because of the zone of *injury.* And a "vector" drawn from the centroid of the infarct to the centroid of the heart may be employed to indicate the electric force produced by the zone of *ischemia.* These "vectors" may be analyzed vectorially from the completed electrocardiogram. These "vectors" may be constructed quite precisely both for the frontal plane of the body and spatially.

ELECTROCARDIOGRAMS

The five sets of electrocardiograms shown in figures 2 and 3 indicate some of the principles just mentioned.

The standard leads of the three groups of electrocardiograms of patients number 1, 2, and 3 (figure 2) do not definitely indicate myocardial infarction. Although such changes are encountered in myocardial infarction, these changes may be found in other types of myocardial disease. The absence of an R wave, an elevation of the

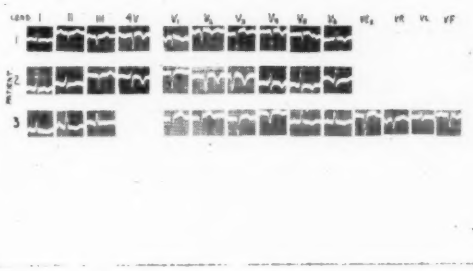

Figure 2. Electrocardiograms recorded on three separate patients who presented typical clinical pictures of myocardial infarction (consult text for details).

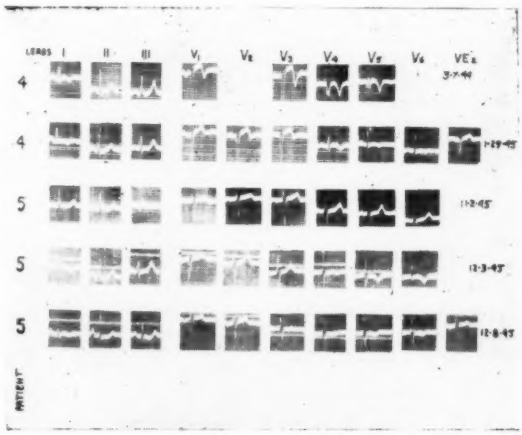

Figure 3. Serial electrocardiograms recorded on two patients with typical clinical pictures of myocardial infarction (consult text for details).

S-T segment and a negative T wave in lead 4V in patient number 1 (figure 2) does show an area of infarction immediately under the precordial electrode, that is, at the apex of the heart. Even though 4V does indicate infarction, the size of the infarct remains unknown. However, leads V_1, V_2, V_3, V_4, and V_5 show changes similar to that described for 4V, while lead V_6 shows an R wave. Therefore, the infarct

extends over the anterior surface of right ventricle, over the interventricular septum anteriorly and over to the medial portion of the left ventricle. It does not involve the free wall of the left ventricle. Since there is an S-T elevation a negative T wave in lead V_6, the zones of injury and ischemia extend to the free wall of the left ventricle. Incidentally, lead I does not show the typical changes of infarction because the area of infarction does not involve the lateral aspect of the left ventricle. The infarct is anteroseptal and therefore the electric force of depolarization concerned with the dead zone is directed perpendicular to the frontal plane of the body. Such a force does not influence the standard leads *(vide supra)*. The limb leads and precordial leads at a level below the level of the fourth chondrosternal junction should have been included in order to outline the basal and apical extents of the infarct.

The standard leads and lead 4V of patient number 2 (figure 2) do not definitely indicate infarction because of the absence of definite diagnostic QRS changes. The rounded S-T segment and negative T in 4V suggest zones of injury and ischemia near the apex of the heart, immediately deep to the precordial electrode. On the other hand, the absence of an R wave, the elevation of the S-T segment and the negative T wave in leads V_1, V_2 and V_3 indicate a strictly anterior infarct or an infarct of the anterior wall of the ventricle. The negative T waves in leads V_4, V_5 and V_6 indicate that the zone of ischemia extends all the way over to the free or lateral wall of the left ventricle while the presence of an R wave in these three leads shows that the dead zone does not extend to the left beyond the interventricular septum. Like in patient number 1, explorations should have been done at higher and lower levels in order to outline the extent of the lesion basally and apically.

The electrocardiogram of patient number 3 (figure 2) does not show definite signs of infarction although the broad slurred Q_3 wave may suggest a posterior infarct. However, the absence of an R wave in leads V_1, V_2, V_3 and V_4 without associated S-T and T wave changes of zones of injury and ischemia indicate an old strictly anterior infarct in a similar location to that described for patient number 2. The absence of an R wave in leads VE_2 and V_F with the S-T segment and T wave changes of injury and ischemia in lead V_F indicate a fairly recent diaphragmatic and posterior infarct (since the epicardial surface of the lesion in posterior infarct faces the left leg the characteristic changes are found in lead V_F while an infarct of the free border of the left ventricle faces the left arm producing the characteristic changes in lead V_L). The clinical picture supports the findings. In 1939 the patient had a typical clinical picture of infarction with electrocardiographic changes of anterior infarct. Six weeks ago he again experienced a typical clinical picture of infarction which the accompanying electrocardiogram shows to be posterior. Like in the two patients described above explorations should have been made at higher levels.

The electrocardiograms of patient number 4 (figure 3) show typical changes of infarction in the standard leads as well as in the precordial leads. On March 7, 1944, several weeks after the onset of the infarct leads V_1, V_3, V_4 and V_5 show the infarct to extend across the entire anterior surface of the heart. Although a lead V_6 was not recorded, the small R wave in V_5 showed that the left border of the area of infarction was not very far over on the left side of the left ventricle. This is further supported by the relatively small Q wave and large R wave in lead I. The S-T segment and T wave changes in the precordial leads indicate the presence of small currents of injury and a highly developed zone of ischemia. About 10 months later (January 29, 1945) the standard leads show relatively little change while the precordial leads show a significant amount of healing. The healing of the infarct with scar formation has reduced the size of the dead zone considerably, evidenced by the presence of well developed R waves in leads V_4, V_5 and V_6. The zones of injury and ischemia have prac-

tically disappeared, a contention supported by S-T segments which are about normal and T waves which are only slightly negative in leads V_4, V_5 and V_6. The absence of an R wave in VE_2 shows the infarct to have extended fairly low. Again, as in the other patients the standard leads were insufficient in establishing the extent of the area of infarction. In addition, if the standard leads alone had been recorded the marked degree of healing would have remained unknown, thus emphasizing also the limitations of the standard leads in the proper evaluation of the progress of the disease.

The three sets of electrocardiograms of patient number 5 (figure 3) are quite interesting. On November 2, 1945, the three standard leads and leads V_1 to V_6 were recorded during a periodic health examination. The tracings were essentially within normal variations. Approximately one month later she presented a typical clinical picture of myocardial infarction. Two days later (December 3, 1945) the second group of tracings were made. Significant changes were found. For example, in lead I the R wave became much reduced in amplitude and a very small Q wave developed, the S-T segment became elevated and the T wave inverted. The changes in this lead and in lead III indicated an infarct involving at least the lateral or left surface of the left ventricle. In the precordial leads, however, the R wave in leads V_5 and V_6 were reduced in amplitude but they certainly were not absent. There was a slight elevation of the S-T segment in leads V_4, V_5 and V_6 with a negative T wave in these three leads. The tracings taken five days later (December 8, 1945) checked these findings and showed signs of reversion of the electrocardiogram toward normal, indicative of healing. There is no doubt that this patient has an infarct. The location is not known. The "special" type of Q wave in lead I tends to rule out infarction within the septum unless it is small or near the border of the septum. Certainly there is no large dead zone of muscle that reaches the epicardium over the areas explored.[11] There were zones of injury and ischemia on the anterolateral aspect of the left ventricle (S-T segment and T wave change in leads V_4, V_5 and V_6). It is possible that there was a high lateral infarct, a fact that could have been evaluated by leads recorded from a higher level. A more likely location is an intramural infarct located in the anterolateral wall of the left ventricle. This is supported by the relatively low R wave in leads I, V_5 and V_6. The zones of injury and ischemia which would surround such an infarct conform with such an interpretation. An intramural infarct may reduce the amplitude of an R wave but is usually associated with a definite R wave.

COMMENT

From the electrocardiograms and theoretical discussions above, it becomes obvious that the use of standard leads alone or standard leads and a single apical lead is not sufficient properly to evaluate the electrocardiographic status of a patient. Obviously, it is not necessary or even possible to provide a complete survey of the entire surface of the heart routinely. On the other hand, if a patient presents a clinical picture strongly suggesting cardiac disease, such as an infarct, a detailed survey should be made in an effort to identify and delineate the lesion. The study should be repeated in detail as often as the clinical progress of the disease warrants. Until a complete exploration has been made in a patient suspected of infarction the electrocardiographic interpretation should be withheld. For example, if only the standard leads and lead 4V had been recorded in patient number 2, the electrocardiogram would have been misleading. The patient would have been considered to have no definite infarct or only a small one, too small to result in typical electrocardiographic changes. Furthermore, the lesion would not have been localized. Adequate precordial leads overcame these difficulties. A good rule to follow is: Any patient who presents a clinical picture which is sufficiently suggestive of myocardial infarction should have not only the standard leads but the conventional six V leads and the three limb leads as well. A strict adherence to this rule will avoid many difficul-

ties. In patients who present themselves for routine examination and who present no cardiac manifestations suggestive of heart disease it is only necessary to record the standard leads. Should these standard leads lead to suspicion a more complete survey should be made. If one's practice will permit, it is a good idea to record all three leads, the six V *leads* and the three limb leads routinely.

As pointed out previously, exploration of the precordium from the usual six points is often not sufficient. More exploration should be done depending upon the data accumulated by means of the more conventional leads. It is somewhat unfortunate that the standardization of the precordial leads carries with it the idea that they constitute a complete exploration. The extent of exploration is to be determined by the problems of the individual patient.

An integration of the depolarization and repolarization processes, the anatomy of the heart, and cardiac physiology are necessary to appreciate the applications of electrocardiography in cardiac disease. With an adequate knowledge of the principles underlying these factors a proper correlation and interpretation is not difficult. These principles should always be applied in order adequately to evaluate a patient.

SUMMARY

The electrocardiograms of five patients selected from a relatively large group were presented to illustrate the inadequacy of the three standard leads and a single apical lead for the proper evaluation of myocardial infarction. The forces responsible for the electrocardiographic changes characteristic of infarction were briefly discussed. Multiple precordial leads were presented to show the value of these leads in the diagnosis, delineation and management of myocardial infarction. A patient who presents a clinical picture sufficiently characteristic of infarction to warrant an electrocardiogram should have a complete exploration of the heart to ensure an adequate electrocardiographic survey.

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DISCUSSION

Dr. J. L. Gouaux (New Orleans): I would like to say that I agree absolutely with what Dr. Burch has said regarding the importance of precordial leads. At Charity Hospital we started using the single precordial lead about 1940 and I do not have the exact figures—I have never gone over them, but I do not think there is any question about the value of the single precordial lead, in giving a higher percentage of positive diagnoses in patients with coronary disease, either infarcts or ischemia. I have always felt that the diagnosis of ischemia is as important as infarct. The percentage of positive electrocardiographic diagnoses has increased and lately we have been using from three to four to five precordial leads routinely.

Another thing we found out is that you can not select patients for additional study. For a while we thought this possible, but inspection of the first electrocardiogram and in terms of that and the patient's clinical history to ask for additional leads to be made, but you run into so many complicating types of pictures; persons with no history of coronary disease and positive electrocardiograms, that we have stopped atttempting to select patients for study, and take multiple leads on all patients.

I do not know any more that I can add except one suggestion about electrocardiograms and that is in regard to having serial electrocardiograms of patients suspected of coronary closure without infarct. In our ordinary work we see pictures barely suggestive, that is, without definite signs either of infarct or ischemia and we ask for serial electrocardiograms. In ordinary practice we take pictures twice a day or every two or three days following a coronary attack. Often times the meaning of serial electrocardiograms is misinterpreted. I prefer three or four or six in the first week instead of the same number over a period of three or four or five weeks. These are often more valuable during the first week of observation.

Dr. George E. Burch (In closing): I have nothing very much to add except to thank Dr. Gouaux for his remarks. I would like to indicate again that if a patient presents a clinical picture which is sufficiently suggestive of infarction that warrants an electrocardiogram then that is an indication for complete exploration. As Dr. Gouaux indicated, it is sometimes impossible to select patients for exploration with accuracy, and we have to apply certain general rules in order not to miss any areas of involvement.

ROENTGEN PELVIMETRY*

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NEW ORLEANS

In spite of its limitations, pelvimetry has been considered an important phase of obstetrics. Roentgen pelvimetry came into prominence following the contributions of Mackenzie Davidson,[35] Manges,[36] Johnson,[29] Thoms,[46] Ball,[6] Snow[45] and others. In their classic and exhaustive work, Caldwell and Moloy[8-11] have established practical and clinical significance to the mathematical figures obtained by providing a simple and accurate classification of pelvic types and detailed information regarding the mechanism of labor in each type.

The Johnson method of stereoroentgenometry was selected because of its accuracy, its adaptability to available x-ray equipment and because it permitted stereoscopic study of the structure of the maternal pelvis and the relative size, shape and position of the fetal skull. The early work of Caldwell and Moloy was accomplished by the use of the Johnson technic and their present method of precision stereoscopy emphasizes the importance of the third dimension. While the Johnson method was found entirely satisfactory for accurate measurement of the pelvic diameters, cephalometry was not possible in all cases because the position of the fetal skull did not always permit measurement of useful diameters. Movement by the fetal skull between stereoscopic films, although readily noted, also prevented accurate measurement. The factor of fetal skull movement is inherent in all technics requiring multiple exposures. In 1935, Ball introduced volumetric pelvimetry and cephalometry and this provided the most practical method, within reasonable limits of error, of estimating fetal skull size. The combination of stereoscopic study and pelvimetry, volumetric cephalometry and sacral measurements has provided much valuable information.

Roentgen pelvimetry and cephalometry should be considered supplementary aids to the obstetrical analysis of the individual case and should never replace clinical examination, sound judgment and obstetrical experience. It is especially important that a final decision should not be based upon relative and arbitrary mathematical figures resulting from the contraction of one diameter of the pelvis. The pelvic shape and structure, the position and presentation of the fetus and the age and condition of the patient merit serious consideration. The question of adequate available space anterior or posterior to a contracted transverse diameter will depend upon the other diameters, sacral measurements and stereoscopic study of the subpubic arch, sacrosciatic notch and the side walls of the pelvis.

The four fundamental types of obstetrical pelves have been described by Caldwell and Moloy[8] as follows:

"The android or 'male' type previously designated as the 'funnel' variety presents a wedge or heart shaped inlet, narrow fore pelvis, protruding symphysis, short posterior sagittal diameters and short anterior transverse diameter of the inlet, long sacrum and converging sidewalls.

"The anthropoid or 'assimilation pelvis' presents an oval inlet with long antero-posterior and posterior sagittal diameters and short transverse diameters.

"The platypelloid or 'flat' pelvis presents a transverse oval inlet with long transverse and short antero-posterior diameters. The posterior sagittal diameters correspond to those of the average gynecoid form.

"The gynecoid or typical 'female' pelvis presents a round or slightly oval inlet, wide fore pelvis with relatively long posterior sagittal diameters, smoothly curved sacrum and an adequate sacral angle."

In a series of 500 cases, the android form occurred in 29.4 per cent, the anthropoid in 19.2 per cent, the platypelloid in 5.2 per cent and the gynecoid in 46.2 per cent.

The classification of Caldwell and Moloy will prove valuable if one recalls that al-

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most 50 per cent of pelves present mixed forms. The pelvis can thus be divided into anterior and posterior segments by a plane passing through the transverse diameter of the inlet and the bi-ischial diameter. Thus, the android-gynecoid form means that the posterior segment is of the android type and the anterior of the gynecoid. Many combinations of the four fundamental types of pelves are possible. The asymmetric and the generally contracted pelvis fall into one of the four fundamental groups or the various combinations thereof.

In a previous study[2] an effort was made to correlate the results of stereoroentgenometry and clinical experience and the methods of delivery were investigated in 379 cases. In a group of 205 cases with normal measurements, 203 or 99 per cent delivered normally. Of the 66 cases with measurements showing contraction of more than 10 mm., 14 or 21.2 per cent had normal deliveries, 47 or 71.2 per cent were delivered by section and 4 or 6.0 per cent by high mid forceps. In a series of 45 patients with contracted bi-ischial diameters of 10 mm. or more, only 3 or 6.6 per cent delivered normally.

In their series of obstetrical patients Steele and Javert[44] found the pelvic diameters normal in 85 per cent and contracted in 15 per cent by clinical examination. Following x-ray examination, normal pelvic diameters were found in only 70 per cent and contracted diameters in 30 per cent. In the present series the cases were divided into normal pelves with normal or greater than normal diameters; borderline with from 5 to 10 mm. contraction in one or more diameters; and into a contracted group with 10 mm. or more contraction in one or more diameters. Normal diameters occurred in 55.9 per cent, border line pelves in 27.9 per cent and contracted pelves in 16.1 per cent (table 1).

TABLE 1
CLASSIFICATION OF CASES

	No. of Cases (1,767)	Per Cent
Normal diameters	989	55.9
5 to 10 mm. contraction	493	27.9
10 mm. or more contraction	285	16.1

Table 2 shows the average pelvic diameters as determined by the Johnson method of stereoroentgenometry. The average normal figures obtained for the diameters of the pelves of cases that delivered normally show an increase of from 0.1 to 1.7 mm. Table 3 contains the measurements of the diameters obtained in each of the four fundamental types of pelves.

TABLE 2
AVERAGE PELVIC DIAMETERS

Diameters	1,767 Cases	Williams
Inlet		
Anterior-posterior	11.82 cm.	11.0 cm.
Transverse	13.62	13.5
Anterior transverse	10.1	
Right oblique	12.92	12.75
Left oblique	12.95	12.75
Mid-plane		
Antero-posterior	11.59 cm.	11.5 cm.
Transverse	10.45	10.5
Posterior sagittal	4.51	
Outlet		
Antero-posterior (to sacrum)	11.59 cm.	11.5 cm.
Antero-posterior (to coccyx)	10.01	9.5
Transverse	11.23	11.0
Posterior sagittal	7.5	
Sacrum		
Chord	11.5 cm.	
Index	2.2	
Angle	72°	

The end points of the majority of the pelvic diameters were selected according to Williams.[30] The antero-posterior diameter of the inlet was measured from the superior symphysis pubis to the mid-point of the reflections on the sacrum of the continuation of the ileopectineal lines. The posterior sagittal diameter of the inlet was measured from the same sacral point to the mid-point of the transverse diameter of the inlet. This aids in the classification of the pelvis as it is shortened in the android, lengthened in the anthropoid and equal in the platypelloid and gynecoid types. The anterior transverse diameter of the inlet is measured across the ileopectineal eminences and is useful in indicating the available space in the forepelvis. It is shortened in the android and anthropoid types and lengthened in the platypelloid. The posterior sagittal diameters of the mid-plane and outlet, measured from the tip of the sacrum or the most distal fixed segment of the

TABLE 3
DIAMETERS OF THE FOUR FUNDAMENTAL TYPES OF PELVES

Diameters	Android	Anthropoid	Platypelloid	Gynecoid
Inlet				
Antero-posterior	12.4 cm.	14.0 cm.	9.8 cm.	11.7 cm.
Transverse	11.5	10.2	14.7	13.6
Anterior transverse	8.2	7.8	11.3	9.9
Right oblique	11.2	12.0	11.6	12.8
Left oblique	11.2	12.2	11.4	13.0
Posterior sagittal	2.9	6.8	3.9	4.9
Mid-plane				
Antero-posterior	10.8 cm.	12.7 cm.	10.0 cm. (525)*	11.5 cm.
Transverse	9.4 (440)*	8.2 (295)*	11.5	10.6 (625)*
Posterior sagittal	3.0	5.9	3.2	4.5
Outlet				
Antero-posterior (to sacrum)	10.8 cm.	12.7 cm.	10.0 cm.	11.5 cm.
Antero-posterior (to coccyx)	9.0	10.6	8.6	9.8
Transverse	10.5	9.5	11.5	11.2
Posterior sagittal	5.5	7.9	6.0	7.6
Sacrum				
Chord	12.0 cm.	10.0 cm.	10.2 cm.	11.7 cm.
Index	1.7	0.8	1.9	2.4
Angle	76°	82°	80°	70°
Fetal Skull				
Fronto-occipital	11.2 cm.		11.5 cm.	11.8 cm.
Sub-occipito-bregmatic	9.2			9.6
Biparietal		9.7 cm.		
Circumference	33.0	31.0	32.8	32.0
Volume	610 c.c.	500 c.c.	600 c.c.	560 c.c.

*Volumetric Capacity in c.c.

coccyx to the mid-points of the bi-ischial and intertuberous diameters respectively, are indicators of the available space in the posterior pelvis at these levels. It has been stated that when the sum of the bi-ischial and posterior sagittal diameters at the mid-plane is less than 13.5 difficult delivery may be expected. At the outlet 17 has been considered the arbitrary minimal figure. It is obtained by the addition of the lengths of the intertuberous and posterior sagittal diameters.

Considerable attention has been directed to a study of the length, inclination and curvature of the sacrum. A line drawn from the sacral promontory to the tip of the sacrum subtends the curve of the sacrum and has been designated the "chord." In this series the chord varied from 7.8 cm. to 17.2 cm. with a mean of 11.5 cm. A perpendicular from this line or chord to the deepest portion of the sacral curve has been called the "sacral index." The average of this measurement has been found to be 2.2 cm., with variations from 0 to 5.9 cm. The sacral angle is measured at the intersection of the chord and the plane of the inlet, and in the average case measures 72° with a variation from 51° to 98°.

Obstetricians have long recognized the hazards introduced by the long straight sacrum set at a small angle to the pelvis. Another source of difficulty has been experienced in the case of the well-curved short sacrum in which the radius of the arc of curvature is considerably less than that of the fetal skull. The effect in this case is similar to that of the straight sacrum since the curve is too small to accommodate the fetal skull. The relationship of the sacral chord, index and angle should be considered especially in those borderline cases where an adequate posterior pelvis is essential for safe delivery.

The size and shape of the sacrosciatic notch determines the space available in the posterior segment of the inlet. In the android form of pelvis the notch is relatively narrow and angular at its apex. In the anthropoid pelvis the notch is relatively long

and more curved. The platypelloid form presents a notch which is similar in type but shorter than the gynecoid or female type. The posterior sagittal diameters and the sacral measurements are indicators of the size and shape of the sacrosciatic notch.

The subpubic arch varies considerably from the narrow angular form of the android pelvis to the curved arched type of the female pelvis. It is not always a reliable index to the pelvic type. The size and shape of the subpubic arch is closely related to the forepelvis and to the inclination of the sidewalls of the pelvis. The sidewalls may be divergent, straight or convergent. Considerable difficulty is experienced in attempting to express the form of the subpubic arch in mathematical terms. The inclination of the sidewalls should always be considered in connection with the measurement of the bi-ischial diameters in order to determine whether contraction of this diameter is the result of large ischial spines or of a narrow converging pelvic cavity.

CONCLUSIONS

1. Roentgen pelvimetry is most valuable when closely correlated with clinical observation.

2. The Johnson method of stereoroentgenometry may be employed to provide a series of accurate mathematical measurements which may be utilized as a basis for the anatomical study of the obstetrical pelvis.

3. Stereoscopic examination is a valuable aid in the study of the structure of the maternal pelvis and of the size, shape and presentation of the fetal skull.

4. The Ball method of volumetric cephalometry is a practical technic for the determination of fetal skull size if allowances are made for the possibility of fetal skull movement.

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DISCUSSION

Dr. E. L. King (New Orleans): What I would like to say is a few words about the clinical side of pelvimetry. First of all in what cases is it indicated? Is it necessary to have x-ray pelvimetry in every obstetrical patient? Not at all. We should rely first of all upon the clinical interpretation of that pelvis. I think we should not overlook the importance of the old fashioned pelvimetry that we have been trying to teach for many years. It is not absolute as far as that is concerned but by careful clinical pelvimetry we get a fairly good idea as to the pelvis and also in that way get some idea as to whether or not we are dealing with a normal or an abnormal one. Clinical pelvimetry includes the well known external measurements: measurement of the outlet; estimate of the shape of the pelvic cavity and the question as to whether the walls are straight or curved, as Dr. Ané has brought out; the estimate of the ischial spines, which is extremely important, whether or not they are prominent and whether or not to expect trouble; and the diagonal congenital, if it can be reached. Some of us with short fingers can not reach the diagonal congenital in a normal pelvis.

Another thing to be considered from the clinical point of view in pelvimetry is whether or not this patient has a head well down in the pelvis. As we know it does settle down in the average primigravida a few days before the onset of labor. If it is not well down we look for possible trouble, particularly if measurements indicate some contraction. If the head is well down and we feel that the ischial spines are not unduly prominent then we can feel reasonably certain that that baby is going to come through. In dealing with a multigravida of course we have an index by considering the patient's obstetrical history, in which case it is extremely important to know something of the weights of the previous babies. We should not forget that many multiparas have a habit of having larger babies as time goes on. You may deliver one or two small or fair size babies through the pelvis and with the third or fourth baby may get in trouble because the baby is considerably larger. When we get a patient who shows potential trouble in the pelvis from clinical observation, a multigravida with history of previous trouble, or feel from examination that the baby is larger than previous babies, then we are right in resorting to x-ray pelvimetry. We might say, theoretically every patient should have x-ray pelvimetry but frankly it is not too important if we are careful in clinical judgment of pelvis and comparison of baby to the pelvis. It is perfectly obvious that the size of the baby has a great deal to do with it; a small baby will go through a small pelvis, a larger baby will not go through the same pelvis.

That brings out a point that Dr. Ané did not stress very much because he was talking primarily of the pelvis—that is the estimation of the size of the fetal head which roentgenologists always attempt to make for us as well as the estimation of size of the pelvis at various diameters. That is extremely important and it is not always easy to do as brought out because the baby does not have the habit of holding the head still long enough. You can generally catch it pretty well though the rule worked out by experience is if at the inlet the size of the fetal head is calculated, by x-ray, to be fifty cm. or more than the volume of the inlet you may be headed for trouble. At the level of the ischial spine the upper limit of safety is put to 200 cm. of discrepancy. If the head is 200 cm. more than the volume at the ischial spine the baby may get through by work of the mother and considerable work on the part of the obstetrician, but there may be damage. I like to go no higher than 75 or 80 cm. Over that I prefer section.

It is extremely hard to evaluate these things and the roentgenologist is of great importance but his clinical judgment is not final. We find that we do sections on these patients sometimes without

a true trial of labor. That trial comes into play particularly in the contraction at the pelvic inlet. If the rest of the pelvis is all right we can attempt to try a little labor there to see if the baby can get through. If there is a normal inlet but a contracted midplane you may get into serious trouble. That is the region which gives most difficulty and where we will do elective sections sometimes without trial of labor. We may do a section unnecessarily but most of us prefer section even if unnecessary in order to guarantee a healthy baby with no damage to the mother.

We are all afraid of these flat sacrums because they cut down the available space for the fetal head. The lateral view is of great importance. The question of whether the baby's head can get by that sacrum is what worries us.

I was interested in Dr. Ané's statement that the clinical measurements in one series showed 80 per cent normal and 15 per cent contracted and x-ray on the same cases 70 per cent normal and 30 per cent contracted, showing the fallibility of the clinical measurements; valuable but not by any means absolute. I was also interested in noting in the series less than 50 per cent of the patients presented a true gynecoid pelvis; and the smallest per cent was in the platypelloid group.

We obtain great help from roentgen pelvimetry but we have to interpret the reports in the light of the clinical picture and together the two will give us a pretty fair idea as to how to proceed. Neither one will be absolute. The best the roentgenologist can do is to give measurements and figures and leave it up to us to decide. I like to study the films myself in addition to the figures. It is a great advantage to have a viewbox and look over the plate and compare with figures and clinical measurements and compare with the estimate you have made on examination abdominally and vaginally, as to what to expect, and make a pretty fair decision before the patient goes into labor.

Now, speaking entirely away from the subject—we find x-ray of considerable value in considering the position of the baby, not whether posterior or anterior but whether the head is well flexed or not. This is of great value in breech presentations; whether frank or full and where the feet and arms are, all of which is of value in helping to determine how to manage that particular patient. We fall back on the roentgenologists quite a bit and find them a great and indispensable aid but we still must insist that the clinical judgment and careful clinical study of the patient is of paramount importance.

Dr. L. A. Fortier (New Orleans): My experience has been altogether with the use of the Ball method in roentgen pelvimetry. We have found it satisfactory for our work and it seems to satisfy the men who have sent us the cases to study. This requires two views: The AP and lateral and the study is made comparative between the pelvic measurements and the fetal skull. We, who do x-ray work, know that the fetal head may shift in position but this does not always happen and many times we can get a good idea about the size of the fetal head. The allowance of 200 c.c. greater volume of the skull in comparison with the volume of the smallest diameter of the pelvis as suggested by the originators of this method works well in our hands.

The study of the pelvis and of the fetal head gives much information as to the abnormalities of the fetus, hydrocephalus, anencephalus, and so on. I recently had a patient who showed osteogenesis imperfecta which was unrecognized until the baby was born. In this instance the fetal spine could be seen *in utero*.

Dr. King is quite correct in saying that you must use clinical judgment. That goes for everything in the practice of medicine and surgery. Nobody should rely on one form of examination alone and it takes good team work to get the job done.

Dr. J. N. Ané (in closing): I wish to thank Dr. King and Dr. Fortier for their remarks. Dr. King brought out the points regarding the combination of obstetrical judgment, clinical examination and x-ray pelvimetry. The roentgenologist should not be expected to prognosticate the course of labor. The question of whether the baby can be born normally can not be settled by x-ray alone.

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COMPLICATIONS OF OBESITY

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It will be my purpose in this paper to discuss the extremely prevalent condition of obesity and to emphasize the importance of it to the practitioner of general medicine, not only as a cosmetic curse to humanity, but as a killer and definite threat to longevity. This problem is not one set aside for the internist or even endocrinologist as most "fattys" would have you think, but rather a simple and commonplace one which is the result of an increased supply of and decreased demand on bodily energies.

The importance of the practitioner's knowledge of the seriousness of obesity is further made evident by the fact that it is so easily preventable and curable, such a procedure being relatively simple, practically standard, without untoward effects, and most often successful. The apparent early innocence of obesity lulls most physi-

cians into a false sense of its benignity and creates in them an attitude of indifference towards this protean malignancy.

There are, of course, many different types of obesity ranging from the complex endocrinopathies to simple overeating and/or sedentary living. All of these, however, have in common one point which is obligatory for the storage of fat—that is, too much fuel for too little fire. Many combinations are, of course, possible, as for example: (1) Taking what the usual run of people consume, as far as calories are concerned, but taking less exercise and fewer mental excursions and therefore that particular person will burn basal metabolic calories, only a few others, and the rest, whether acquired from protein, fat, or carbohydrates will be stored as neutral fat in the usual reservoirs. (2) Taking the normal amount of exercise but eating in excess of basal caloric needs and the amount required for maintenance under those conditions. This person also will store fat in the same manner. (3) Taking the average amount of food and exercise for height, weight, sex, and occupation, but just not burning as much of those calories as an average person would. The basal metabolic rate is probably at fault here and "gland trouble" could legitimately be blamed, but, however, merely as the predisposing cause since that particular individual is taking in more calories than he actually requires and hyperalimentation then is still the precipitating cause. (4) Taking average amounts of food and exercise but having some endocrine, systemic, or any one of several other obscure disorders which predispose to fat deposition usually in aberrant or at least unusual sites. In this latter condition again though, the prime evil is still too much food for individual needs.

By way of simplifying the above four classes it appears logical to say that obesity results from (a) exogenous and (b) endogenous causes. The former represents too much food for the oxidative processes and the latter represetns too little in the way of oxidative processes for the food.

Since the purpose of this paper is to discuss the complications of obesity, I shall only touch on those conditions in which obesity is simply a manifestation of dysfunction or disease of some specific organ or system. (1) Gonadal insufficiency, whether due to atrophy, excision, or infection, as a cause for undue fatness is best exemplified by eunuchs and women past the menopause. This as the only cause would be hard to prove because of the close interrelationship between the gonads and the thyroid. (2) Hypothyroidism may be a cause due either to fat accumulation or edema (myxedema) or both. (3) Hypopituitarism is a classical example of a peculiar type of fatness, dystrophia adiposogenitalis, or Fröhlich's syndrome being the best known. This is associated with a lesion of the anterior lobe plus the posterior lobe or hypothalamus. Cushing's syndrome, pituitary basophilism, is also recognized. (4) Dercum's disease, adiposis dolorosa, has several etiologic possibilities, alcoholism and congenital syphilis being the older ideas and hormonal influence (pituitary vs. thyroid) being the newer. (5) Laurence-Biedle-Moon syndrome[3] was formerly thought due to pituitary deficiency but is now considered part of a hypothalamic disorder. It is manifested by obesity, sexual infantilism, retinitis pigmentosa, polydactylism, mental deficiency, and a familial tendency.

THE PRICE THAT IS PAID BY THE OBESE

1. *Cardiovascular System:* If fat were merely deposited peripherally and caused no greater load on the body than its increased weight, that alone would necessitate additional muscular exertion to carry it around. Besides the added burden of actual weight there is also the burden of additional blood supply to the fat depots. It has been calculated[12] that five-sixths of a mile of blood vessels are needed to supply each pound of fat and by simple arithmetic one can see that for thirty pounds of fat one would need twenty-five miles of extra vessels plus additional work by the heart which was not built for such an insult. This would of course, place a greater strain on the heart and circulatory system even

if they *per se* were not directly affected. Such is not the case, however, since this system is one of the most vulnerable to the onslaught of avoirdupois.

In regard to the heart itself there may at first be many symptoms related to cardiac weakness when in reality these are caused merely by increased weight, pericardial fat, and respiratory restriction due to upward pressure on the diaphragm by a fat-laden peritoneal cavity or liver or both. The longitudinal axis of the heart is shifted upward to the left and the apex beat moves out to the anterior axillary line without any actual change in heart size. The left diaphragm is pushed up farther than the right, forcing the heart toward the right and presenting a picture similar to right sided enlargement as well. Due to the thick chest wall and heavy breasts in females the percussion note also may cause a normal heart to appear very much enlarged. The deposition of fat in and around the recesses of the pericardium too may indicate enlargement or alteration of the cardiohepatic angle. If there is an associated dilatation of the heart besides the diffusion of dullness, an inherent weakness is probably present and compensatory changes will be few. Dilatation in a normal heart could be compensated for by greater filling but this does not follow in one whose reserve strength and functional capacity are diminished.

Even the evaluation of murmurs loses some of its significance in the corpulent individual because of the altered course of the aorta. The diaphragm pushes the initial portion to the right and the transverse portion to the left. This twist may cause a systolic murmur and an accentuated A_2 could be caused by its greater proximity to the chest wall. A correct evaluation then of all pertinent clinical data could be made only with the aid and corroboration of accurate roentgenologic studies along with the pertinent physical signs and symptoms.

Another phase of the vascular response to obesity is its effect on blood pressure and it is well known to most clinicians that hypertension is often relieved in the obese by a reducing regime. It also has been shown in animal experimentation[20] that both normal dogs and artificially produced hypertensive dogs when made to gain large amounts of weight would show a marked elevation of blood pressure, chiefly systolic, and just as marked a decrease when allowed to lose the extra poundage. The true relationship of human hypertension to obesity is still unsettled, but it does seem very likely that a simple increase in peripheral resistance may be the main factor. Musser[14] also has shown a close relationship between obesity and hypertension but has added diabetes mellitus to his syndrome. In a series of thirty cases he has demonstrated in obese hypertensive women, sugar tolerance curves which approach those of a diabetic patient. Hypertension of course, is not an infrequent finding in diabetes since arteriosclerosis is so frequently encountered concomitantly, but a greater percentage of the obese diabetics have a hypertension and also to a more marked degree. To sum up these effects Joslin refers to diabetes as "the fat man's folly" and to obesity as "the open door to diabetes."

2. *Heat Dissipation:* This often proves to be a most annoying and uncomfortable complication of obesity even though it is not a particularly dangerous one. With the increased deposition of fat in the body wall the normal physiologic mechanism of heat loss through conduction and radiation is interfered with and reduced by the insulating effect of the fatty superficial fascia. Sweating in this situation then is increased.

3. *Surgery:* In obesity of any etiology there is an impairment of practically all organic functions and in consequence a lowered resistance of the organism as a whole. It is therefore the duty of the surgeon in all non-emergency cases to evaluate carefully this problem of obesity preoperatively and if possible to correct it.

As has been stated obesity will prematurely affect the cardiovascular system and there is a definite predisposition to thromboses, emboli, and cerebral hemorrhage.[19]

It is easy to see how the upward pressure

on the diaphragm might embarrass respiration through a decreased vital capacity and lead to any of the pulmonary postoperative complications of which atelectasis following upper respiratory infection is the most common.

The liver function may be altered and cholelithiasis and hepatomegaly with fatty invasion are often seen. The metabolism of all foods, carbohydrate, protein, and fat itself are affected as well as the excretory and antitoxic functions. Even relatively minor surgery may in some unknown way provoke a state of hepatic insufficiency if any preoperative impairment was present.

Constipation, normally a postoperative problem, comes into more prominence and should be considered even more carefully in the frequently constipated obese.

Renal function impairment is sometimes very distressing and extra effort should be made in the obese to prevent oliguria, albuminuria, and hyperazotemia.

The actual mechanics of surgery too are affected in the obese and many procedures are made difficult if not nearly impossible to do thoroughly and efficiently. To cite an example, one author[6] has modified his technic for the surgical treatment of cancer of the body of the uterus in the obese. He has found that in total hysterectomy on these people it is almost impossible to prevent the pads of extraperitoneal fat of the abdominal wall from rolling over the vagina after it is cut away with contamination and peritonitis possibly as very serious sequellae. This writer prefers to do a subtotal hysterectomy, bilateral salpingo-oophorectomy, and cauterization of the mucosa of the remaining cervical stump. The usual method of closure and reperitonealization is done.

4. *Gallstones:* An observation probably obvious to most medical men is the increased incidence of gallstones in the obese, Bauman[3] having set a figure of 88 per cent of gallstones occurring in obese individuals. As far as sex distribution is concerned, women are more frequently affected than men. From 5 to 10 per cent of the total population is said[5] to show cholelithiasis at autopsy while 20 per cent of women who have borne children show it. Anything causing hypercholesterolemia will not always predispose, since it has been shown that the incidence in myxedema, nephrosis, and other conditions, is no greater than is normal although the cholesterol level is elevated, but in many conditions in which cholelithiasis is present, hypercholesterolemia has been given the major part of the blame. Such is true in pregnancy, obesity, and in people with sedentary habits.

5. *Diabetes:* (a) Mellitus—This has already been discussed to some extent under the cardiovascular system and there was some hint that all diabetes mellitus was not due entirely to a pancreatic deficiency. The glycemic state tended to vary with the patient's weight in Musser's 30 cases and this was corroborated by another group[15] who treated 370 cases of diabetes mellitus between the ages of 30 and 65, two-thirds of whom were overweight when the treatment was begun. In general these patients had been overweight for years, hypertension was present in 40 per cent, and cataracts were not uncommon. A representative section of this group were given a test on their ability to oxidize dextrose and then placed on a reducing diet. These tests were repeated during their periods of treatment (solely weight reduction) and again after completion. Only those willing to conform strictly to the regime were accepted for study, their number being 35. The results show that the disturbance in dextrose metabolism is intimately associated with the degree of obesity. More than 90 per cent became aglycosuric and did not spill any sugar in their urine when fed the test meal. They also exhibited normal dextrose tolerance curves. As a conclusion these authors suggest that the glycosuria and abnormal response to test meals of glucose are due to excessive deposition of fat in the liver with the result that there is an impairment of its ability to store glycogen properly.

(b) Insipidus—Although no definite relationship of this condition to obesity is completely accepted, a case[10] was reported

in which a patient on developing the polyuria and polydipsia first lost a few pounds (for two years) and then rapidly gained almost to double her normal weight in the succeeding six years.

6. *Polypnea:* Besides the respiratory embarrassment caused by actual mechanical lowering of the vital capacity there is also another cause for polypnea in the obese and asthenic. It was found[1] that many individuals, especially weak and obese ones required a greater amount of respiratory interchange in order to eliminate the necessary carbon dioxide. Its level normally in expired air is about 3.7 to 4.5 per cent and this varied with the physical condition of the subject, going up in athletes and down in asthenics. With this change then one can easily see how an increased number of respirations or at least an increased depth of respiration would be a physiological necessity.

7. *Parturition and Puerperium:* In pregnancy an increased weight may be due to (a) increased fat prior to pregnancy; (b) increased retention of water and salt; (c) unphysiologic weight increase during pregnancy (greater than 22 pounds). It has been generally accepted in the literature that there is a higher incidence of practically all complications of pregnancy in the obese,[21] prolonged labor, puerperal infection, thrombosis, embolism, edema, albuminuria, hypertension, kidney involvement, eclampsia, and abnormal position of the fetus. One point of practical importance is the diagnosis of pregnancy, which in extreme cases of obesity may prove most perplexing without the aid of animal tests. Many of these women have irregular menstruation to begin with and palpation and auscultation may not lend much help.

Because of the added fat deposits in the pelvis mechanical dystocia may present a problem. All pregnant women then should be admitted to a hospital at the onset of labor in order that their proper management be allowed should any unforeseen situation arise.

8. *Gonalgia:* This condition is frequently seen in women past 40 and most commonly in those who are obese and in the climacteric (50 per cent of the latter group[1]). It is known by several names: Menge's arthritis, Munk's dry arthritis, climacteric arthropathy and so on. The first symptom often is pain on the internal surface of the patella noticed on climbing stairs and with slight efforts. Later it may even be noticed at rest and there may be pain on pressure. Finally one observes an enlargement of the knee without effusion and a limitation of motion. Radiography shows marginal osteophytes of the tibia, femur, and patella and these usually undergo an early decalcification.

Salicylates usually will not relieve the condition but good results are frequently obtained simply with a light bandage from the tips of the toes to the knee.

9. *Reflex Gastrointestinal Hypermotility:* It is usually thought that constipation is the chief gastrointestinal complaint of the aged and the obese, but, however, in the latter there is a considerable number suffering from a diarrhea of several normal movements per day. In the typical case of which I am speaking, clinical examination failed to reveal any abnormality other than the obesity. By way of an explanation, a German worker[16] observed gastric hyperperistalsis associated with deep breathing, due he hypothesized, to the pressure of the diaphragm from above. In obesity now there is an increased pressure from all sides and the same rapid emptying time is noted from the stomach practically to the rectum.

10. *Amenorrhea:* In reality this is not one of the sequels of obesity but rather a concomitant finding sometimes seen in certain types, especially the endogenous (ovarian endocrinopathies). The causes of this type of amenorrhea are: (a) ovarian insufficiency with anomalies in tempo of the menstrual cycle; (b) ovarian insufficiency manifesting itself chiefly in a hypoplasia of the uterus itself.

CONCLUSION

No better proof of the malignancy of obesity is offered than by actual life insurance statistics which prove conclusively that longevity and obesity do not go hand

in hand for "as we lengthen the waist-line we shorten the life-line."[12] In many causes of death the rate is several times higher in the obese and only one disease to my knowledge is favorably affected, as far as mortality rate is concerned, by obesity, and that is tuberculosis.

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RUPTURE OF THE DEEP EPIGASTRIC ARTERY

ROBERT KAPSINOW, M.D.
LAFAYETTE, LA.

Hematoma occurring within the rectus sheath is seen so infrequently that invariably it is mistaken for more frequent abdominal pathology. These diagnoses are most usually twisted ovarian cyst, appendicitis with abscess formation, strangulated hernia or acute abdominal emergencies. A review of 21 cases shows that only two cases were correctly diagnosed prior to operation. Hemorrhage within the rectus sheath is not as rare as it has formerly been considered. Nevertheless the error in diagnosis has been so consistent that a review of the subject seems justifiable.[1-4]

The chief cause for failing to recognize this surgical entity is due to a lack of appreciation of the mechanics whereby it is brought about. The hemorrhage results from a rupture either of the superior or inferior deep epigastric artery or the accompanying veins or the rectus muscle or all these together. The variation in the severity of the symptoms depends upon which combination of these occurs. In the last analysis it may be safely stated that the hematoma occurs as a result of trauma of some sort, although in the cases reported it must be admitted that the precipitating injury was very minor and that other factors contributed to the rupturing of the rectus muscle.

An excellent description of the anatomy of the contents of the rectus sheath was found in an article by Cullen and Brodel,[5] to which liberal reference has been made. The arterial supply to the rectus muscle is peculiar in several ways. The beginning of the inferior and superior epigastric arteries are fixed points which do not give way on tension. They lie dorsally to the muscle and their branches enter at almost right angles with a festoon effect. As the abdominal wall varies according to sex, age, nutrition, posture and muscularity, so does the position of the epigastric artery vary. The majority of cases of hematoma occur in that position of the rectus sheath below the umbilicus, and of these the majority are found on the right side. This frequency of occurrence may be due to the fact that torsion, flexion or extension of the rectus muscle is invariably greater on that side which the individual uses most. The accumulation of blood below the umbilicus may

so increase in size, pushing the peritoneum inward, that it easily suggests an intra-abdominal lesion.

Many of the contributing factors which initiated the hemorrhage in the cases reviewed were coughing, sneezing, exercise of varying intensity whether continuous or sudden, pregnancy and infection.[6-9]

The symptoms of hematoma depend upon the degree of trauma and the amount and rapidity of bleeding. A large group of cases go undiagnosed as a rule because of the relatively minor nature of the pain and the speed with which they recover. These individuals usually lead sedentary lives and only occasionally take strenuous exercises or do any heavy work. Frequently after 24 hours they complain of a soreness on one or the other side of the abdomen. Examination may reveal nothing more than a slight rigidity and the cause of the pain, while correctly attributed to the unaccustomed exertion, is not accurately diagnosed. Usually the pain goes by the name of muscle strain and within a few days it subsides and no diagnosis is made.

The cases recorded in the literature are divided between those showing acute and rapid symptoms and those that are delayed. The patient with the acute type develops sharp localizing pain in the abdominal wall on either the right or left side. There may be nausea or vomiting. The patient may even develop a rapid pulse and appear in shock; the temperature may be somewhat elevated. The pulse is rapid but the blood pressure is seldom affected unless shock is present. The findings on examination depend upon whether the bleeding is in the lower third or in the upper two-thirds of the rectus sheath because the absence of the posterior sheath in the lower third permits greater hemorrhage with peritoneal irritation. Hence these patients seem to be gravely ill. When hemorrhage occurs in the upper two-thirds of the rectus sheath it is most frequently confused with acute cholecystitis.[10-15]

Most of the delayed cases reported occurred in women who were either pregnant or were old and obese. The trauma in these cases was usually a coughing or sneezing attack. This merely indicates that the epigastric vessel which had already been so severely stretched either by the pregnancy or the obesity that the extra stretching of a violent cough or sneeze, was enough to rupture it. These patients developed a slowly increasing mass with slightly elevated temperature. In many instances these were diagnosed as twisted ovarian cysts or abdominal abscesses of varying causes. Leukocytosis was usually present. Several patients showed a slightly icteric tint. The most important single factor in correctly diagnosing this condition is to know and consider its possibility in a certain given environment.

The treatment is necessarily surgical. The rectus sheath must be opened, the clot removed and the bleeding vessel ligated. In those cases with delayed symptoms the blood has become so intimately interspersed in the muscle fibers that it cannot be removed. The abdomen should not be opened and the wound should be closed without drainage. In the recorded cases most were opened and explored and coexistent abdominal pathology which might be present, was corrected.

CASE REPORT

Mrs. M. S. K., a white female aged 63, weighing 160 pounds, complained of pain in the right lower abdomen which began three days prior. The onset was sudden but not severe. She was worried because the pain persisted and a lump was developing in the right lower quadrant. There was no nausea or vomiting. Her bowels had been regular and she had had no fever.

On examination a firm rounded mass about the size of a small orange was palpable to the right side of the lower midline and extending to the umbilicus. It was difficult to delineate the mass because of the obesity. Tenderness was not acute and the patient moved about fairly freely in bed. Pelvic examination was likewise difficult because of the senile changes in the vagina and the abdominal obesity making a bi-manual palpation impossible. There was no history of direct or indirect trauma obtainable at the time. The diagnosis was confused by the fact that the patient stated she had had repeated attacks of appendicitis. Red blood cells 4,200,000, white blood cells 10,800, polymorphonuclear cells 72 per cent, small lymphocytes 26 per cent, monocytes 2 per cent. The sedimenta-

tion rate was normal and the Wassermann was negative.

Under spinal anesthesia a lower right rectus incision was made. Upon exposing the anterior rectus sheath it was found to be discolored and bulging. Incision through the sheath exposed a mass of clotted blood separating the fibers of the rectus muscle and extending from the pubis to one inch above the umbilicus. Upon removing some of the clotted blood a slight oozing was found coming from a lateral branch of the deep epigastric artery. No other source of bleeding was found. As the patient was under spinal anesthesia she was again questioned in regard to trauma and it was learned for the first time that prior to the onset of her illness she attempted to turn the mattress of her bed by herself. It was then that she felt a sharp pain in the right lower abdomen but thought nothing of it. The peritoneum was opened and an appendix with a fecolith was removed. The abdomen was closed without drainage. The patient made an uneventful recovery.

DISCUSSION

The interesting features in this case were the apparent insignificance the patient placed upon the trauma as the cause of her trouble, the slowness in the development of the mass and the history of repeated attacks of appendicitis.

Spontaneous rupture of the deep epigastric vessel producing hematoma of the abdominal wall presents a fairly typical picture. A review of the subject has been presented because of the frequent errors in diagnosis. The ensemble of a sudden onset of pain followed by swelling either to the right or left of the midline, with symptoms of peritoneal irritation usually in pregnant or old and obese women, should lead to a correct diagnosis prior to operation. Operative interference is justifiable in all such cases except the very minor type.

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STUDY OF CHILD HEALTH SERVICES

Post-war planning for child care has received much attention during recent years from many organized groups and individuals throughout the country culminating in legislation now before Congress. The American Academy of Pediatrics, realizing that the responsibility for such planning rests primarily in the hands of physicians themselves, has launched the Study of Child Health Services in order first, to gather necessary facts from which well-founded plans can be evolved, and second, to determine the extent and quality of services now available. Thus the physicians, unquestionably the ones who know what constitutes good care and who for the most part provide that care, have accepted the challenge to develop constructive plans for medical service to children.

The Study of Child Health Services was first inaugurated by the Academy of Pediatrics at its meeting in St. Louis in November, 1944, and is developing into the most important and extensive project which the Academy has undertaken. The organization work of the study has been completely set up and a test survey was made in North Carolina in 1945. This test survey is proving to be very successful and it was decided that it should serve as a guide for the study on the national level.

The project is unique in that it is a study by the pediatricians themselves of the medical care received by and available to children, of existing facilities for medical care and the education and training of physicians giving the care. It is not a study by a lay group, a foundation or a department of the government. It must be emphasized that the study is in no way connected with the many plans which have been proposed for medical care, nor related to any of the Federal proposals for medical care, such as the Pepper of Wagner-Murray-Dingell bills, which are the center of so much present-day controversy. It is the viewpoint of the American Academy of Pediatrics that the important thing is to find out on a nation-wide basis what medical care American children receive and what facilities for medical care are available. Only on such a foundation can sound and intelligent plans for the future be built.

One of the fundamental purposes of the present study is to stimulate local groups to discover for themselves the needs of their own community and the facilities to meet these needs. Essentially, this seems the collection on a vast scale of adequate and reliable data. Although the Academy of Pediatrics is committed to carry out the task, the success of this tremendous under-

taking is the responsibility of individual physicians everywhere.

To obtain a complete picture of the existing child health facilities, data will be collected by means of questionnaires on every important aspect of pediatric and medical service. Four major categories will be studied. First, hospital facilities; second, community health services, official and voluntary; third, distribution, qualifications, and activities of professional personnel; and fourth, pediatric education.

The administration and conduct of the study in each state will be under the direction of the state chairman of the American Academy of Pediatrics, who, with the help of an executive secretary, will organize the program and correlate all the many activities involved. Dr. Clarence H. Webb of Shreveport has been appointed state chairman for Louisiana and Dr. Orville C. Thomas of Shreveport, executive secretary.

At a meeting of the pediatricians of Louisiana in New Orleans on April 12, 1946, Dr. Clarence Webb presented the entire program as contemplated for the state of Louisiana. After adequate discussion, the pediatricians voted unanimously to conduct the study in this state.

O. C. THOMAS, M. D.

SURGERY OF CONGENITAL CARDIOVASCULAR DEFECTS

Recent advances in the surgical treatment of congenital cardiovascular defects has stimulated the interest of the pediatrician, surgeon, cardiologst, internist and general practitioner. Until very recently most physicians were entirely satisfied to make a diagnosis of congenital heart disease without any attempt to classify its character anatomically, feeling that such interest was only academic. This approach to the problem of congenital heart disease is no longer justifiable, because certain types can now be successfully treated surgically and the possibility exists that the number may be increased in the future. It is therefore most important to determine, if possible, the character of the congenital defect, or defects, and to do everything possible to improve and protect the general condition of the individual until such time as surgery can be done or the child is old enough for an exact diagnosis to be made.

In the Harvey Lecture for 1945, Alfred Blalock* discusses the advances in surgical therapy in patent ductus arteriosus, coarctation of the aorta, and tetralogy of Fallot. As he states, the advances are definitely recent as shown by the statement of Paul White in 1937 that "there is no curative treatment, surgical or medical, for congenital cardiac defects." The work of Abbott, Taussig, Gross, Burwell and others stimulated interest in the field. Although previous work had been described by Munro and Strieder, Gross was the first to perform a successful closure of an open ductus arteriosus in 1938. The operation has been performed successfully many times since, and led the way to surgery in other types of congenital lesions. Experimental work done by Blalock and Park, and work by Crafoord in 1944 and Gross in 1945 opened the way for possible surgical treatment of coarctation of the aorta. Finally Blalock worked out a technic for surgical therapy in pulmonary stenosis and pulmonary atresia, most commonly seen in association with other defects comprising the tetralogy of Fallot. This consists in an anastomosis of the subclavian, carotid or innominate artery with the right or left pulmonary artery. Up to November 1, 1945, there had been 57 operations on 55 patients for this condition at Johns Hopkins. The first two patients have died since operation. The third patient is unchanged. Of the remaining 52 patients, 40 are improved, two are unchanged, and 10 have died.

The improvement in the 40 cases has been in most cases a change from almost complete invalidism to apparent normality.

BENADRYL

And now another new drug, this time one to be used in the symptomatic relief of urticaria, hay fever and vasomotor rhinitis.

*Blalock, Alfred: Physiopathology and surgical treatment of congenital cardiovascular defects, Bull. N. Y. Acad. Med., 22:57, 1946.

Benadryl, a new anti-histamine substance, promises to relieve the edema produced by the histamine or histamine-like substances in these conditions. It decreases the cutaneous vasodilation and has an antispasmodic effect on smooth muscle. Chemically the drug is beta dimethylaminoethyl benzhydrl ether hydrochloride.

In a recent symposium by members of the Mayo Clinic Staff,* the results in the treatment of urticaria, hay fever and asthma, vasomotor rhinitis and serum reactions are enumerated and discussed. The authors found that the symptoms of urticaria were relieved in most cases, often as soon as one hour after the first dose, and in a few cases the attack of urticaria was terminated. Relief was also obtained in patients with angioneurotic edema. The dosage varied from 50 to 100 mg. daily by mouth.

In hay fever patients almost complete relief was often obtained after two or three doses of 50 mg. of benadryl by mouth daily. After the first dose symptoms were relieved within one hour and the effect lasted from five to eight hours. In asthma, the drug was less effective, only a few patients getting partial relief.

In children the symptoms of these disturbances and serum reactions were relieved. Approximately two mg. of benadryl daily per pound of body weight seemed to be adequate.

The drug may be given intravenously, intramuscularly or orally. It is moderately irritating when given intramuscularly. Side effects are greater with oral than parenteral administration, and include drowsiness, dizziness, dry mouth and nervousness. All are transient and mild. Nausea and vomiting may require discontinuance of therapy. Since the drug decreases gastric acidity in some cases, it may offer a new approach to the control of gastric acidity. Drowsiness, not undesirable at bedtime, may be combatted during the day with caffeine or benzedrine, and nervousness is not marked if the daily dosage is kept small.

The new drug, now available, opens vistas of relief for those sufferers of these annoying conditions.

*Carryer, H. M., Farber, E. M., Horton, B. T., et al., Proc. Staff Meet., Mayo Clin., 20:417, 1945.

ORGANIZATION SECTION

The Executive Committee dedicates this page to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.

An informed profession should be a wise one.

FURTHER DATA ON THE WAGNER-MURRAY-DINGELL BILLS

All members of the State Society should read the following brief which was prepared by a special committee from the Executive Committee approved by the Executive Committee and presented by a special delegation including Drs. Val Fuchs, M. D. Hargrove, Rhett McMahon, P. T. Talbot and E. L. Zander to the Senate Committee on Education and Labor in Washington, D. C., on April 17. This expresses the views of our organization concerning this legislation and all of our doctors should be interested and active in attempting to have these bills defeated.

VIEWS OF THE LOUISIANA STATE MEDICAL SOCIETY IN REFERENCE TO SENATE BILL 1606 AND HOUSE BILL 4730

We realize that there is some attempt made by these bills to expand and provide for needed medical services; a feature which is universally approved by the entire medical profession and something which we have been constantly trying to perfect for many years. The best medical minds

in the world have been and are busy working on a continuation of this plan. Even through the most destructive war we have ever had and with the small number of men remaining at home, there has been no let-up in this activity during this period of time. The revolutionary plans as provided for in the bills, which should be regarded as socialization of medicine, are typical of postwar periods and such plans after being tried usually revert to the methods of the past.

Following is a review of S. 1606, for your information:

The bill is basically in error in presuming that with the increase in medical care there will be a reduction in the incidence of disability and illness in childhood, because, for such a reduction all students of health realize the basic needs are improvement of environments, especially of rural families, essential clothing, food, personal and community hygiene, housing, sanitation and raising the standards of literacy.

The bills will not supply more adequate medical care as claimed by the proponents, which is the motivating influence claimed for such legislation. The results, to the contrary, will produce inferior and politicalized medicine and thus delude the American people in this erroneous impression.

The implications in these bills are un-American and alien in ideologies, typical of totalitarianism and communism which were the domniating rule in Germany, Italy and Russia. This is socialized medicine more sweeping and even more far-reaching than any ever attempted in any country, with the possible exception of Russia.

It should be conceded by well supported data that the *medical profession* of this great country, on past performance and their potentialities, would be the right and proper group to turn to and depend upon for any remedial changes, if needed, in order to render adequate medical care, therapeutic medicine and research.

Any form of compulsion, implied or stated, is contrary to our democratic concepts and robs our country of the stability and strength so strongly manifested by free enterprise, so elemental to our social economy. This freedom of medical opportunities has contributed more to the strength, health and happiness of this great nation than any other factor, which has resulted in making our nation the greatest and strongest in the world.

The United States Public Health Service should never be restricted or hampered in the functions assigned to them of preventive medicine by added burdens of therapeutic medicine for which they are not prepared by practice to perform, comparable to our regular physicians. Their fields of preventive medicine offer many opportunities which have been so ignominiously neglected to their discredit and reaction on the health of the nation.

In regard to Title I, Section A, we would refer to our statement above.

Concerning Title I, Section B, we object to the Federal government encroaching on the practice of medicine in any of its branches. We feel that the care of pregnancy and the care of infants and crippled children are specialized branches of medicine and should be left to the medical profession to provide for medical care in the same manner as they do for all other diseases of the human body. In regard to treatment of crippled children, we feel that this field of medicine is very thoroughly taken care of in our state by the organized profession and allied groups and that the provisions for taking care of these children are adequately provided for on a state basis.

We do not understand why provisions for the above services should be included in this bill as all are provided for now by the Federal government. If larger appropriations are needed for the conduct and expansion of any of this work there is no doubt that Congress now has the power to grant same.

In reference to Title I, Section C, "Grants to States for Care of Needy Persons" we approve grants-in-aid to supplement funds of state and local agencies to provide full medical care and hospitalization for the needy; same should be provided only to persons whom the payment for such serv-

ices would be a hardship, and same should be done with state control and local administrative authority as now being done in our state; supplying medical care and hospitalization both free of charge.

We object to Title II in its entirety for the following reasons:

The Surgeon General would be authorized and directed to arrange for the availability of benefits; he would have full control of the expenditure of unestimated billions of dollars without outside interference, setting up a one-man dictatorship.

The patient would not have the free choice of a physician, but would have a choice only of a physician who is a member of the panel; i.e., a physician who has agreed to work under the plan and on condition that the Surgeon General has not so limited that physician's practice as to preclude the acceptance of more patients. Should the patient's family physician not be a member of the panel said individual would be required to pay his family physician's fee for medical service, after having already had a tax for medical services deducted from his earnings. The fundamental rights and democratic privileges of freedom, to select one's own physician, and the great comfort enjoyed in the maintenance of the patient-physician relationship is destroyed by these bills.

In every instance where the government has interfered in the distribution in the quality of medical care, it has destroyed the initiative and the incentives of the individual doctor and it has robbed the medical profession of its independence and its self-respect.

The states would be forced to accept the provisions of the bills whether they approved this legislation or not; this would be unconstitutional because it does away with state rights. (Following the close of the Civil War the medical profession had incorporated in the constitution of Louisiana provisions whereby all state activities carried on in charitable institutions, grants to hospitals and individuals should be a state responsibility.)

The present expansion of voluntary prepayment medical insurance, both from a national and state viewpoint, the great increase in industrial medicine and the enlargement of contracts for medical and surgical service through commercial insurance groups, all at a lower cost than will be required under these bills, should preclude the necessity for governmental supervision of medical care. The American Medical Association, which is in a better position to know the medical needs of the country, has recently adopted a constructive program for the improvement of medical care. (Refer to the attached clipping from the March 9, 1946, Journal of the A.M.A.) The objectionable features contained in the bills introduced by Messrs. Wagner, Murray and Dingell have been entirely eliminated in the national program of the American Medical Association, sponsored by physicians on a voluntary prepayment basis substituting a process of evolution rather than revolution.

We are in favor of seeing that everyone is provided with proper medical care but are opposed to further taxation on an already overburdened public and particularly to the inequitable payment of such taxation. The low income individual, who is now eligible for medical services free of charge in city and state institutions in Louisiana would be compelled to pay for such services.

Unemployed individuals over 65 years of age would not be eligible for participation, leaving them to the mercy of the public and their friends even though they may have participated in the plan for a number of years.

It would require at least 300,000 bureaucrats to administer this program.

Federal funds would be provided to subsidize medical education and medical research. We are opposed to this provision of the bills because the Surgeon General would be authorized and directed to administer grants-in-aid to non-profit institutions and agencies engaging in research or undergraduate or postgraduate professional education, and he would have some $80,000,000

annually at his disposal. Such a program would lower the standards of opportunity in this field and would probably inhibit the dissemination of such results as might accrue to those who are most deeply interested in such discoveries. Most of the great discoveries and improvements in medicine since the foundation of our country have been done by private initiative by our medical schools and by grants and loans from philanthropical sources and associated medical groups, such as pharmaceutical houses, instrument houses, and prosthetic houses, which have aided the medical profession in keeping the high standards of medical practice which it now enjoys. Therefore at the present time the American medical profession stands head and shoulders above the medical profession in any other country in the world. We feel that the American public is better protected than the people in any other country in the world. We feel that the American public has a right to this continued medical service and that it should not be dissipated by such revolutionary measures as proposed in the Wagner-Murray-Dingell bills.

On April 8, Dr. King Rand attended a conference of State and Territorial Health Officers in Washington. At this meeting he took the occasion to express to the officers present the views of the Louisiana State Medical Society concerning these bills.

On March 30, the members of our committee on Rural Medical Service, Dr. Guy R. Jones, chairman, and Drs. J. P. Sanders and M. C. Wiginton, members, attended a national conference on rural medical service in Chicago. A report will be made by this committee at our 1946 meeting and unquestionably recommendations will be made for advancement of this service in our state.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of very month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	
Shreveport	First Tuesday of every month	Shreveport
Vernon	First Thursday of every month	

DE PAUL SANITARIUM

The regular monthly meeting of the Medical Staff of De Paul Sanitarium was called to order at 8:05 p. m. with Drs. Beach, Thompson, Henry Colomb, Anderson, Friedrichs, Holbrook, Otis, Hite, Willoughby, Connely, Soniat, Hill, Dubos and H. P. Harris in attendance.

The scientific portion of the program commenced with Dr. Holbrook presenting Mrs. L. S., Case No. 4507, that of a white female with dementia praecox admitted two weeks previously, in a highly emotional state, delusional, and hearing voices telling her that God wanted her to commit suicide and bite her tongue off. She so bit and chewed her tongue that profuse hemorrhage followed with complete mutilation, gangrene and sloughing of the outer half. The case was discussed by Drs. Otis, Anderson, and Beach. Next Dr. Hunter P. Harris, Jr., presented Dr. J. L., Case No. 4534, that of a 64-year-old physician who was admitted to De Paul supposedly as a morphine addict with nervous phenomena, unsteady gait, jerky chorea-form movements and signs of dementia. A probable diagnosis of Huntington's chorea was made and the case was discussed by Drs. Anderson, Otis, Connely, Holbrook and Dubos. Finally Dr. Friedrichs discussed the postmortem findings and diagnoses of four recent autopsies, one showing a glioma and the other three medical causes as responsible for death.

The chairman next called for the reading of the minutes of the previous meeting but it was moved and seconded that this be dispensed with. Dr. Otis, as chairman of the Record Committee next read

the reports of the various departments all of which showed satisfactory improvement. Sister Anne then rose to thank the Staff for the kindnesses shown the new class of nurses and voiced her appreciation in their behalf. There being no further business the meeting was adjourned at 9:55 p. m., followed by the serving of refreshments.

LOUIS J. DUBOS, M. D.,
Secretary.

TOURO INFIRMARY

The regular meeting of the Medical Staff of Touro Infirmary was held on Wednesday, April 10 at 8 p. m. The following program was presented: A Clinico-pathologic Conference by the Department of Pathology with a clinical discussion by Dr. C. L. Eshleman; Portal Shunt: A Surgical Treatment for Cirrhosis, by Dr. Sam Nadler; Primary Malignancy of the Small Intestine, by Dr. Sam Romano.

TO MEMBERS OF THE NEW ORLEANS HOSPITAL COUNCIL

HOSPITAL COSTS

It is evident to all of us, not only in New Orleans, but throughout the entire country, that the continued rise in hospital costs is forcing us to consider an upward adjustment in hospital rates. The question of how this increase may be best passed on to the patient or what part of it can be absorbed by administrative economies is a challenge to all hospital administrators. Anyone who has devoted time to the study of this subject realizes the possibility of a percentage increase in hospital costs during 1946 much higher than can be passed on to the patient, and our recommendations for rate increases are based on the knowledge that the recommended increase will provide less than 50 per cent of the additional amount needed to meet the anticipated increase. It is the opinion of the committee that if economies cannot be effected to meet the balance of the increased costs, then the matter should again be considered by this council at a later date.

The returns in the tenth Poll of Hospital Opinion as to what hospitals are doing with regards to raising rates, and reported in the February, 1946, edition of Hospital Management Magazine, reveals that 22.4 per cent have recently increased rates, 17.2 per cent plan early increases and 31 per cent are considering increases. The recommended increases range from 5 to 20 per cent, and most replies state that the additional revenue will not permit the hospital to balance its budget. Since August, 1939, hospital supplies have increased 75 per cent according to the McGill Commodity Index. During this same time hospital expenses in New Orleans have increased 62.2 per cent and rates have increased but 45 per cent.

The government's efforts to prevent inflation by price control are steadily weakening and we are faced with increased costs of labor and supplies. In the hospital field salaries and other expense each account for approximately 50 per cent of the total cost of operation, and each must be studied to offset the inflationary trend created by the general wage increases to industrial workers and by the lifting of price control by OPA on many hospital commodities.

SUPPLIES

The committee has tried to be as conservative as possible in estimating the probable increases during 1946. In the four-week period that we have had this problem under review, it has been necessary to increase our estimate and yesterday's paper regarding meat prices also affected our forecast.

Food is the largest item and accounts for 30 per cent of all supplies. The government is no longer using the huge quantities of previous years, and the production goal of 1946 is commensurate with the 1945 level. Unless we have a drought, which some people predict, foodstuffs should be more plentiful, and there should be a substantial increase in agricultural production in Europe during the year which will reduce the necessity for continuing heavy shipments for rehabilitation purposes. We consider the increase in food costs will be lower than any other group, with the exception of *drugs.*

Cotton Goods: These goods have increased at least twice this year and may be increased again in the near future. A 20 to 25 per cent increase may well be considered and protective inventories for at least 90 days are advisable.

Drugs: No basic price change is anticipated during the first half of 1946 in drugs which amount to 10 per cent of all hospital supplies. The productive capacity for drugs was stimulated to an extensive degree due to the pressure of war requirements. The army realized that they had overestimated their needs by about 50 per cent. In a peacetime economy it is necessary to use up this surplus stock and to adjust production schedules down to normal consumption. Production costs may hold steady but the element of competition should prevent any drastic upward trend.

Paper Goods: The prolonged shortage of paper goods is not destined to end abruptly. The output of 1945 will be exceeded by over one million tons during 1946. The price is definitely going higher and inventory protection is advised. Many restrictions have been cancelled and we should again consider the importance of quality when purchasing this commodity.

Fuels: Fuel oil, bituminous coal and gasoline are clouded with uncertainties. The visible supply of liquid fuels continues to climb, as production is holding a relatively high level and consumption is

on the decline. Bituminous coal production will increase in the spring as more labor and transportation facilities are made available, and the supply-to-demand ratio for 1946 should improve (barring another strike). Protective seasonable reserves should be maintained, and only a moderate price rise is expected.

Household and Laundry Supplies: The indications are that a rise of at least 15 per cent may be anticipated during the year. The shortage of material is at present strengthening the market. If OPA lifts the price control, an additional 5 per cent increase may be expected.

Surgical Supplies and Equipment: Surgical equipment is scheduled for a considerable increase. During December, 1945, OPA approved Amendment 12 to Supplementary Order 126, lifting price control from hospital equipment items, including x-ray, laboratory, physiothermy, surgical and dental equipment and instruments. These items immediately hit the stratosphere. Advice from several manufacturers and many hospital equipment dealers, indicates increases of 10 to 100 per cent on all hospital equipment items, with an average from 25 to 30 per cent. Supplies are expected to show a 10 to 15 per cent increase. These price increases are so definite that the new catalogues now in preparation will record these changes.

Salaries and Labor: The national trend of labor will inevitably affect our individual institutions, as evidenced in New York and elsewhere, and by the substantial increases recently given to industrial workers. It has been evident to most hospital administrators for several years that high wages in hospitals are here to stay. We must expect to pay comparable wages with industry. There are two ways in which this situation can be met. Either increase income or employ fewer, higher paid, more efficient and better-trained personnel to produce the same amount of service.

Accounting: The discussion of hospital costs would not be complete without some reference to uniform methods of accounting and compiling statistics. These two items are the elements of the system, and the advantage of uniformity is known to you all. A hundred and one references could be given on this subject, but we will limit ourselves to one which is available to all of you, and the following being abstracted from an article in Modern Hospital, February, 1946, entitled, "Are Your Figures Based on Facts," by our good friend, Everett Jones, who is now technical advisor to that magazine. The contents of this abstract are basically the same as the procedures that many of us, who entered hospital administration by way of the accounting field, have been preaching for twenty-odd years.

"From a study of hospital charges in many parts of the country it is evident that rates are not often established on a business-like basis. The American Hospital Association's council on administrative practice, committee on inclusive rates, in its splendid report of May 12, 1945, makes this statement: 'In the absence of exact calculations, the determination of a hospital's rates and charges has always presented one of its more perplexing problems. That little or no consistency is present in the practices of hospitals in this regard becomes immediately apparent when comparisons of hospitals of like size and type are made.'

"We can well start on the thesis: 'Charges should be established with a definite relation to the cost of rendering service.'

"Considering these basic facts, the following would appear to be a sensible method for establishing hospital charges:

"1. Establish the average cost per patient day through the use of the American Hospital Association's standard chart of accounts and bookkeeping procedure. The importance of using this standard procedure by all hospitals cannot be overemphasized. With the average cost per patient day thus established the hospital can successfully defend its figures to the public, to Blue Cross plans, to public welfare officials and to compensation and commercial insurance carriers. And do not forget to include proper depreciation on equipment and fixtures.

"2. Set the lowest established rate for ward patients so that the average billings per patient per day will equal the average cost per patient per day less about 5 per cent.

"The average daily billings for all extra services supplied by the hospital plus the daily ward rate should equal the daily cost. In those states or localities in which welfare department payments for indigents and compensation or other commercial insurance carrier payments are based on the hospital's lowest established rates to the general public, the hospital would be receiving payments equal to the costs from such sources.

"Of course, there will be some ward patients who want to pay their own way but cannot afford full ward charges. Their bills can be discounted by any fair amount. Discounts to patients found worthy after careful investigation can range all the way from 5 to 100 per cent. At the end of every year the total discounts will provide an honest picture of the amount of charity work done.

"3. Starting with the lowest or base rate charges, any percentage needed to balance the budget can be added to semi-private and private room patient charges. Operating on the theory that charges for extras should be the same for all economic levels of patients, the entire increase will have to be made on the day rates.

"It is time for hospitals to get out of the economic woods and establish orderly, business-like procedures. We must 'grow up' business-wise and

realize that the public's eyes are focusing on us. Successful conduct of our affairs, orderly and sensible relations with federal, state and local officials, Blue Cross plans, commercial insurance carriers and the general public depend on business-like methods.

"The keystone of all good business methods is standardized bookkeeping and accounting and the establishment of charges on a cost base."

The problem of further rate increases is a serious one.

Economies alone cannot absorb the anticipated increase, and the cost of hospital care is climbing to a point which will force the ideas of socialized medicine upon the great middle class group of citizens.

The rich can afford the tariff, and the low income earner is eligible for free care in our charity wards or hospitals, but the middle class is struggling under a weight which increases with every new development in medical science.

Nothing is gained by increasing the salaries of incompetents and "deadheads," and an increase may have no other effect than to increase absenteeism. The proper approach to the labor problem, regardless of the size of the hospital, is a detailed job analysis of the entire personnel, the eliminating of all non-productive employees, the increase and equalization of the pay scale for similar jobs, and a definite personnel relations program. An economy which stands out clearly to an executive is the adequate or lack of training displayed by a person in the use or misuse of valuable and ofttimes irreplacable equipment.

An essential feature in the conservation of supplies is a perpetual inventory of stores and equipment. It has many advantages in a hospital where supplies cannot be controlled as rigidly as in industry and where the sudden discovery of an exhausted supply may create an emergency. Accurate cost records point the way to economies, assures information which will assist in the preparation of a budget, and furnishes the groundwork for the comparison of the costs of services with the rate assessed. There is no reason why hospitals should render service to pay-patients at less than cost, any more than we should expect employees to work in hospitals for substantially less than they can earn elsewhere.

Looking back over the years, I would venture that low-paid hospital employees have contributed as much, if not more, to charity than private philanthropy.

The latest price trends, appearing in March, 1946, publications indicate that higher prices are scheduled in steel, lumber, and textiles. These three items are extremely vital to the production of most hospital equipment and supplies.

Indications are that OPA has no recourse other than to adjust prices of raw materials upward, and that price adjustments will again be made in the finished goods field in the near future.

The question of stalling off severe inflation such as occurred after World War I is vital to all of us, but is shrouded in the nation's economic confusion.

The strikes which have occurred have indefinitely postponed our return to mass production, but have also acted as a brake to inflation.

All of the above leads us to the definite problem at hand—of meeting our increased costs in New Orleans.

It has been pointed out that the increased costs will greatly exceed the rate increases recommended, and we sincerely hope that each hospital administrator will endeavor to effect economies before a further rate increase is approved by this council.

It is the hope of this committee that member hospitals of this council will consider the use of the American Hospital classification of accounting so that any further adjustments in rates may be allocated on a cost basis.

At the present time, with private hospitals selling services to so many governmental agencies, it is mandatory that all expenses be properly classified, as the government pays actual cost, and our figures are carefully scrutinized and compared with similar institutions by government auditors.

These social trends in the payment of hospital expenses are evidenced by the large number of patients' bills paid by Blue Cross Plans, Health Insurance and the many governmental agencies such as The Children's Bureau of the Department of Labor, sponsoring the Crippled Children's program, the Emergency Maternity and Infant Care Program, Vocational and Rehabilitation programs under the Department of Education, the Public Health Service Act which will subsidize the erection of non-profit hospitals, the division of Nurse Education of the United States Public Health Service subsidizing the training of nurses, and last but not least, the Veterans' Administration.

The Central Coast Conference, comprising the voluntary hospitals in five counties in California, made the following adjustment in room rates as of January 1, 1946:

	Old Rates	*New Rates*
Wards	$6.00	$7.00
Two bed rooms	7.00	8.00
Lowest priced private rooms	8.00	9.00

Hospitals in New Jersey, New York, Ohio, Florida, New Hampshire, and in general, most hospitals along the East and West Coasts have recently increased their rates $1.00 per day.

Some hospitals have added a flat 10 per cent to the bill and many have increased private rooms $1.00, two bed rooms 75 cents, and wards 50 cents per day.

The committee recommends the following increases in day-rate service only for member hospitals in New Orleans:

Wards, increase of 50 cents per day.

Two bed rooms, increase of 50 cents per day.

Nursery, increase of $1.00 per day, making total fee $2 per day.

Minimum priced rooms, increase of 50 cents per day.

All other private rooms, increase of $1.00 per day.

This schedule will increase the average hospital's revenue from patients about 5 per cent, whereas the outlook for the increase in costs is several times greater.

The value of group action is as important to employers, as it has proven to employees, and if we expect to hold or stabilize hospital costs and rates, we must join together through this council in obtaining current and expert advice and in uniform action in our personnel and public relations. The committee therefore requests that all members representing private hospitals express their opinion in regard to the amount of the rate changes suggested, and that the effective date of the change be voted by the council.

FERNANDEZ TO BE DIRECTOR OF LAFAYETTE CHARITY HOSPITAL

Mr. Robert L. Pettit, director of the State Department of Institutions, announced that Dr. Julius M. Fernandez of Morgan City has been appointed superintendent of the Lafayette Charity Hospital. Dr. Fernandez graduated from Tulane University School of Medicine in 1940 where he was an outstanding student; he was a member of Alpha Omega Alpha which indicates he was in the first ten in his class. Mr. Pettit is to be congratulated upon making such an excellent appointment.

During March Dr. J. W. Atkinson, of Gretna, took a four-week course in psychosomatic medicine at the Temple Medical School. The visiting physicians at this course heard specialists and saw films and demonstrations of various technics.

THE AMERICAN COLLEGE OF RADIOLOGY

The annual meeting of the American College of Radiology will be held in the city of San Francisco, at the Palace Hotel, on June 29. The American Radium Society will meet at the Palace Hotel on June 30 and July 1.

FELLOWSHIPS IN HEALTH EDUCATION

Fellowships for one year of graduate study in health education, leading to master's degree in pubbilc health, are being offered to qualified men and women by the U. S. Public Health Service through funds made available by the National Foundation for Infantile Paralysis.

The fellowship provides a year's study in public health education in an accredited school of public health. This training includes an academic year of eight or nine months and three months of supervised field experience in community health education. The courses include, public health administration, epidemiology, public health and school health education, problems in health education, community organizations, and information technics.

A stipend of $100 a month for the entire period of academic and field training, tuition, and travel expenses for field experience will be paid. Travel to and from the university at the beginning and end of training is not included.

Fellowships are effective for the academic year starting in the fall of 1946.

Men and women, in sound health, between the ages of 22 and 40, who are citizens of the United States and who meet the entrance requirement of the School of Public Health of their choice may make application. In addition to a bachelor's degree from a recognized college or university, courses in the biological and/or physical sciences, sociology, and education may be required. Training in public speaking, journalism and psychology and work experience in a related field are desirable.

Application forms may be obtained fram the Surgeon General, U. S. Public Health Service, Washington 25, D. C. Completed forms, accompanied by two recent photographs, and official transcript of college credits, and a 500-word statement of why applicant is interested in entering the field of health education, must be in the hands of the Surgeon General by June 1, 1946. Only complete applications will be considered.

Veterans with necessary qualifications are encouraged to apply for fellowships. The subsistence allowance for veterans granted under the G. I. Bill of Rights will be supplemented by fellowship funds to bring the stipend to $100 a month.

Candidates must maintain a scolastic average of "B" to retain fellowship.

Persons accepting fellowships will be expected to work in the field of health education for at least two years after completion of training.

The U. S. Public Health Service and the National Foundation for Infantile Paralysis assume no responsibility for placing fellows in positions.

Schools of Public Health include: Columbia University, Harvard University, John Hopkins University, University of California, University of Michigan, University of Minnesota, University of North Carolina, and Yale University. Candidates will be permitted to express their choice of schools, and efforts will be made to grant first or second choice in so far as possible.

These fellowships are not available to employees of health departments, as grant-in-aid funds are available for the training of such personnel.

AMERICAN MEDICAL ASSOCIATION MEETING

During the Secretary-Editor's Conference of the A. M. A. held recently in Chicago the Oklahoma State Medical Asociation announced that it was sponsoring a special train to the 1946 session of the A. M. A. to be held in San Francisco on July 1-5, and invited all other state associations interested to join the Oklahoma physicians on this trip. This will be an all-expense tour with the exception of meals, and the total time to be taken by the trip will be 16 days. This will include travel time from Kansas City, a central assembly point, to San Francisco with five days in the convention city and the balance of the trip, a tour through the Northwest, including Portland, Mt. Rainier, Seattle, Victoria, British Columbia, and Yellowstone National Park.

The Oklahoma State Medical Association has approved the Rainbow Travel Service, authorized travel agents, managed by Mr. Harry E. Kornbaum, and Mr. J. F. Johnson, Jr., of Oklahoma City, to make complete plans with other state medical associations and individual physicians who are members of their component state associations.

For further detail communicate with Mr. Kornbaum, Rainbow Travel Service, Inc., First National Building, Box 652, Oklahoma City, Oklahoma.

INFECTIOUS DISEASES IN LOUISIANA

The weekly morbidity report for the State of Louisiana for the week ending March 2 contained the previous four weeks' report for venereal diseases. During the month of February there were listed 1680 cases of gonorrhea, 1606 of syphilis, 56 of chancroid, 34 of granuloma inguinale and 14 of lymphopathia venereum. Unclassified pneumonia headed the list of other diseases reported this week, there being 174 cases listed. This was followed by 159 cases of influenza, 122 of cancer, 45 of pneumococcic pneumonia, 23 of measles, 19 each of hookworm and rheumatic fever and 11 of puerperal septicemia. Of the diseases listed the following were from military sources: gonorrhea 120 cases, syphilis nine, chancroid two and pneumococcic pneumonia one. Orleans Parish reported three cases of meningococcus meningitis and Ascension, St. Tammany and Terrebonne one each. Poliomyletis was reported by Claiborne and Ouachita Parishes, each having one case. The report for the next week, ending March 9, showed a sharp increase in the number of cases of measles, there being 286 reported. There were also reported 37 cases of German measles. The influenza cases numbered 152, which was seven fewer than reported the previous week. Other diseases occurring in numbers greater than ten were as follows: pulmonary tuberculosis 55, unclassified pneumonia 34, chickenpox 27, hookworm 21, mumps 17 and pneumococcic pneumonia 11. There were ten cases of scarlet fever and ten of whooping cough reported this week. There were two cases of meningococcus meningitis reported from Orleans Parish and one each from Caddo, Calcasieu, East Baton Rouge and Rapides. Calcasieu and Webster Parishes each reported one case of poliomyelitis. There were reported for the week ending March 16, 337 cases of measles a still larger number than reported the previous week. Also reported were 24 cases of German measles. There was a rise in the number of influenza cases this week; 405 being reported. Other diseases in numbers greater than ten were as follows: 42 of mumps, 31 of chickenpox, 25 of unclassified pneumonia, 23 of septic sore throat, 18 of scarlet fever, 17 of malaria and 12 of pulmonary tuberculosis. One case of meningococcus meningitis was reported in each of the following parishes: Avoyelles, Grant, Orleans, Pointe Coupee, St. Mary and Terrebonne. Only one parish, Iberville, reported poliomyelitis this week and this parish had only one case. The report for the week ending March 23 showed a decrease in the number of cases of measles, 260 being reported, which number included 27 of German measles. One hundred and fifty-eight cases of pulmonary tuberculosis were reported this week, followed by 88 of influenza, 31 of chickenpox, 26 of hookworm, 18 of unclassified pneumonia, 16 of diphtheria and 12 of mumps. Nine cases of meningococcus meningitis were reported this week, four of which occurred in Acadia Parish and one each in East Baton Rouge, Orleans, Rapides, St. Martin and Terrebonne. Cameron Parish reported one case of poliomyelitis.

HEALTH IN NEW ORLEANS

The Bureau of the Census, Department of Commerce reported for the week ending March 9, 159 deaths in the City of New Orleans, divided 114 white and 45 colored; 12 of these deaths occurred in children under one year of age; nine white and three colored. There was a rather sharp decrease in the number of deaths occurring during the week of March 16; eighty-one white persons died and 45 colored, making a total of 126. Almost the same number of infants died this week as for the previous week, however, there being nine white and two colored. For the next week, which ended March 23, the number of deaths increased. A total of 143 individuals expired. Of this number 102 were in the white race and 41 in the colored and only four of these occurred in children under one year of age. The March 30 report included 125 deaths in the city, 80 white and 45 colored and of this number the number of deaths in children under one year of age was two and six respectively. The last report received was for the week ending April 6 and indicated 132 deaths in New Orleans, divided 81 white and 51 colored. This week there were reported only five infant deaths, two in the white race and three in the colored.

J. F. POINTS, M. D.
(1880-1946)

Dr. J. F. Points died at the Hotel Dieu on Monday, April 8 at the age of 62. Dr. Points graduated from Tulane University in 1903 and had an internship at Charity Hospital, succeeded by a residency at Hotel Dieu. He was connected with Tulane University, and Loyola teaching staff for some years and was a visiting surgeon at Charity Hospital for fifteen years. He was an active member of the Knights of Columbus, the Association of Commerce and the Parish and State Medical Societies.

HENRY NATHAN BLUM
(1876-1946)

Dr. Henry Nathan Blum, a native of Baton Rouge, died in New Orleans on April 13. He had been senior surgeon at Touro Infirmary from 1903 until 1906, and senior associate in ophthalmology from 1910 until 1926. From 1926 to 1938 he was chief of the hospital's department of ophthalmology and at the time of his death he was consultant in ophthalmology. He was also senior ophthalmologist at Charity Hospital from 1930 until 1934 and taught ophthalmology at Tulane's medical school from 1923 until 1925. In 1931 Dr. Blum became professor of ophthalmology and Chief of the Department at L. S. U. School of Medicine, which position he held until 1934.

LEE LANDRUF COLLINS
(1881-1946)

Dr. Lee Landruff Collins died February 18 at the age of 65 years and 2 days. He was born at Montgomery, Louisiana on February 16, 1881 and was the eldest son of J. W. Collins (deceased) and Mary Elizabeth McLemore.

He was a member of the American Medical Association, Louisiana State Medical Society and had been a member of the Parish Medical Society until his health failed. He attended St. Louis University and graduated from Memphis Medical College in 1906, having taken postgraduate work at the University of Tennessee School of Medicine.

He administered to the sick to the end even on his death bed and will be missed by friends and most especially by the sick and suffering. Dr. Collins was a member of the following Fraternal organizations: Blue Lodge F.&A.M., Royal Arch Masons and Crowley Council No. 28 Royal and Selected Masons.

BOOK REVIEWS

Personality Factors in Counseling: By Charles A. Curran, Ph.D. New York, Gune & Stratton, 1945. Pp. 287. Price, $4.00.

To the reader unfamiliar with psychologist Carl R. Roger's theory and practice of "non-directive psychotherapy" this book by Dr. Curran will present new ideas that may be difficult to accept. For this student of Dr. Rogers has contributed further confirmatory data to the accumulating research on non-directive counseling as a definite and unique kind of psychotherapy.

It is particularly important that the physician and the medical student become acquainted with the viewpoint inherent in this therapeutic technic —that the social history of an individual who seeks help in solving his personal problems is important only in so far and in what manner it is presented and discussed by the person himself. What is important in the past is what is brought out by the person, during interviews, in terms of his feelings and how he accepts them. No formal social history is taken and no questions are asked or answered by the therapist. The counselor reflects or mirrors the feelings expressed by the client, limits his role to this function, and dispenses with the generally accepted processes of "direct treatment," such as diagnosis, evaluation, advising, reassurance and goal-setting. This reflection of client-feeling is termed "structuring," and consists in explaining and defining for the client his own role and that of the counselor during the therapeutic interviews, and what may be gained from them.

Dr. Curran, who is a Catholic priest, typifies the increasing interest shown by religious workers in a scientific study of human personality. He has taken one case, and from twenty phonographically recorded interviews has analyzed the release of forces of growth and development within an individual, which changed this withdrawn, conflict-ridden boy into an independent and self-confident man. He proves conclusively that speech, thought and emotion—seemingly so intangible—can be subjected to scientifically objective analysis. And he illustrates through the case material the unique tenet of the non-directive approach—the client's ability, when freed from tensions and with acquired insight, to formulate and carry out an independent and workable solution of his problems.

The style renders the book readable, although at times it seems needlessly repetitious.

This book, together with Roger's "Counseling and Psychotherapy," is recommended as required reading during the medical student's senior year in psychiatry.

MARION FONT.

The Basis of Clinical Neurology: The Anatomy and Physiology of the Nervous System in Their Application to Clinical Neurology: By Samuel Brock, 2d ed. Baltimore, Williams & Wilkins Co., 1945. Pp. $3.93. Price $5.50.

Entirely reset and extensively revised the second edition of The Basis of Clinical Neurology is thoroughly up to date. Here gathered together are materials from embryologic, anatomic and physiologic sources that lead to an intelligent understanding of the mechanics underlying neural dysfunction, making the book a sound combination of pedagogic clarity with scholarly amplitude. The author handles controversial points with sureness and dexterity.

The book starts off with a brief review of the unit of the nervous system, the neurone and the basic physiologic unit, the reflex arc and then proceeds to consider the anatomy and the role of the spinal cord, the brain stem, cerebellum and higher centers. Special chapters include the vascular supply of the brain and the spinal cord with the clinical syndromes resulting from disturbed circulation, the regulative nervous system and its function and the cerebrospinal fluid. A chapter on posture summarizes our present knowledge of muscle tone.

Dr. Brock is not only a teacher but a gifted, inspired explorer of that important realm of material, abnormal conditions of the nervous system and a writer of real literary merit. His book is clear and bright and complete in itself and arouses a new freshness of viewpoint and a new breadth of understanding.

C. P. MAY, M.D.

Preventive Medicine and Public Health: By Wilson G. Smillie, A. B., M. D., D. H. P., Sc. D. New York; The Macmillian Company, 1946. pp 548. Price, $6.00.

This book, as the author states in the preface, is written for medical students planning to practice clinical medicine and willing to accept the obligation to their patients and to their community to prevent illness and to promote family and community health. This viewpoint is maintained throughout what careful reading proves to be a carefully integrated and a well balanced text. For example, the chapter on vital statistics is written (1) to indicate the importance of the physician as a collector of accurate vital data, (2) to show the importance of proper analysis of these data, and (3) to teach the medical student to read his medical literature with a critical eye. The chapter does just that and omits procedures that can be followed only by the professional statistician. Pages devoted to environmental sanitation are reduced in number in comparison with space given this subject in other texts, since the author justifiably argues that the physician must be acquainted with the principles of the various phases of sanitation but will never have the responsibilities of administration in any of these sanitary endeavors.

The ability to write succinctly is certainly indicated in the chapter on national health services in which the basis of national health services, growth and development, present plan of organization, and present activities are all boiled down into nine easily read pages. Discussions on the work of the public health nurse and adult health protection and promotion are as modern as DDT. Twenty-one tables and 41 charts, graphs and illustrations are used. These are well chosen and present new data.

This book is admirably developed as a text in medical school courses and is within the price range of students financing their own medical education.

RALPH H. HEEREN, M. D.

PUBLICATIONS RECEIVED

Bellman Publishing Company, Inc., Boston: Vocational and Professional Monographs: Physiotherapy, by Thomas Francis Hennessey, M. D.

Brooklyn Medical Press, Inc., New York: The Venous Pulse and Its Graphic Recording, by Franz M. Groedel, M. D.

The Commonwealth Fund, New York: Medicine in Industry, by Bernhard J. Stern, Ph.D.

Froben Press, New York: Evolution of Plastic Surgery, by Maxwell Maltz, B.S., M.D., Sc.D., F.I.C.S.

Grune & Stratton, Inc., New York: Group Psychotherapy, by J. W. Klapman, M. D. Shock Treatments and Other Somatic Procedures in Psychiatry, by L. B. Kalinowsky, M. D., and Paul H. Hoch, M. D.

Paul B. Hoeber, Inc., New York: Ambulatory Proctology, by Alfred J. Cantor, M. D.

University of Kansas Press, Lawrence: A Malariologist in Many Lands, by Marshall A. Barber.

Lea & Febiger, Philadelphia: Diseases of the Adrenals, by Louis J. Soffer, M. D.

MacMillan Company, New York: Normal Lives for the Disabled, by Edna Yost in colloboration with Dr. Lillian M. Gilbreth.

Meador Publishing Company, Boston: Suggestion and Hypnosis Made Practical, by Samuel Kahn, M. D., Ph. D.

C. V. Mosby Company, St. Louis: Synopsis of Physiology, by Rolland J. Main, M. D.

Revere Publishing Company, New York: New Drugs, by Arthur D. Herrick.

W. B. Saunders, Philadelphia: Gastro-enterology, by Henry L. Bockus, M. D.